STEM CELL RESEARCH: AN APPROACH TO BIOETHICS BASED ON SCIENTIFIC NATURALISM

A POSITION PAPER FROM THE CENTER FOR INQUIRY OFFICE OF PUBLIC POLICY

AUTHOR: RONALD A. LINDSAY, J.D., Ph.D.
DIRECTOR OF RESEARCH & LEGAL AFFAIRS
CENTER FOR INQUIRY

REVIEWING COMMITTEE: PAUL KURTZ, Ph.D., DAVID KOEPSELL, J.D., Ph.D.

DATED: JULY, 2006

STEM CELL RESEARCH:
AN APPROACH TO BIOETHICS BASED ON SCIENTIFIC NATURALISM

INTRODUCTION

Rapid advances in biomedical technology in recent decades have resulted in a series of disputes and controversies over the limits that should be placed on scientific research. However, one controversy has been especially prominent and divisive, namely the dispute over embryonic stem cell research, in particular government funding of stem cell research. As indicated by the recent debate in the United States Senate over legislation that would have loosened the restrictions on federal funding of embryonic stem cell research, there is a wide gulf between those who favor and those who oppose government funding of such research. There appears to be little room for compromise. In vetoing the legislation that would have permitted funding of research carried out on a limited class of embryonic stem cells, namely those derived from spare embryos generated through in vitro fertilization (IVF) procedures, President Bush characterized embryonic stem cell research as "the taking of innocent human life" and asserted that each embryo "is a unique human life with inherent dignity and matchless value"(President's Remarks 2006).

If human embryos are entitled to the full protection of our moral norms and the use of such embryos in research is equivalent to murder, then opposition to such research is understandable. However, we should not simply assume, without benefit of a well-reasoned and persuasive argument, that our moral norms and principles apply to embryos. As discussed in more detail below, to interpret norms that prohibit unjustified killing so they also prohibit the use of embryos in research leads to many difficulties, paradoxes and morally indefensible conclusions. At a minimum, we need a compelling argument, firmly grounded in scientific evidence, to support an extension of our moral norms and principles to encompass embryos.

In the balance of this paper, we will examine whether such a compelling argument has been provided by the opponents of embryonic stem cell research. We will conclude that no such argument has been advanced. Furthermore, the view that use of embryos in research is equivalent to the unjustified killing of human persons[1] is inconsistent with accepted scientific evidence, in particular evidence regarding embryonic development, and is not supported by a coherent moral theory. Given the immense benefits that we might derive from embryonic stem cell research, including the development or therapies that could ameliorate or eliminate many debilitating and disabling illnesses and injuries, not only is government funding of such research permissible, but government support of such research furthers critical interests of our society and is of paramount importance.

METHOD IN BIOETHICS

Before discussing the moral implications of embryonic stem cell research, a few words about methodology are appropriate. Method in bioethics is critical. We cannot hope to achieve a consensus on disputed moral issues if there is no agreement, at least in general terms, about the procedures we should use in addressing and resolving moral disputes.

To begin, we believe it is important to acknowledge that the dispute over embryonic stem cell research is difficult to resolve in part because it raises novel questions. Our ancestors did not address ethical quandaries arising out of stem cell research for the obvious reason that such research was not a possibility for them. The status of human embryos and the protection they are entitled to, if any, is a problem of recent origin, so we should not be altogether surprised if there are differences of opinion about the treatment of embryos. This acknowledgment is important because many find uncertainty and doubt about moral questions deeply disquieting and troubling. There is always a temptation to remove such doubts through an unreflective and

dogmatic application of norms and principles that may be widely accepted but which were developed to address different situations. This explains at least some of the appeal of the position that the embryo has the same moral status as a human person and that stem cell research unjustifiably "kills" the embryo. If that were correct, we could avoid the ethical debate over stem cell research and simply state that it is morally wrong -- as morally wrong as subjecting an adult human to harmful experimentation without her consent.

But we should resist the temptation to resort to dogma and vague and uninformative principles such as "the sanctity of life." One indispensable component of secular bioethics is free inquiry. We cannot approach novel moral questions with preset limits on acceptable answers. Dogma is not very helpful in any human endeavor. It has no utility in bioethical inquiry. We need to recognize that moral concepts reflect the circumstances in which we live and our moral code has been developed to deal with the sort of contingencies that normally arise. We must be at least open to the possibility that moral norms, such as the prohibition on unjustified killing, that are universally accepted because they have proven necessary for the peaceful coexistence and cooperation of the members of a human community may not be applicable, or applicable in the same way, to groups of cells that resemble members of human communities only insofar as they have a similar genetic composition.

In addition, our moral arguments must be grounded in an accurate understanding of the available scientific evidence. We are not suggesting that we can deduce our values from facts. "Is" does not imply "ought." However, even though facts do not dictate our choices, they do circumscribe them. A number of arguments that have been advanced in the debates over stem cell research are unpersuasive in part because they are premised on a misunderstanding of the relevant facts.

As just indicated, ethics must make use of, but it is not equivalent to, science. Nonetheless, although there are key distinctions between ethical and scientific inquiry, some aspects of sound ethical inquiry are analogous to scientific inquiry. In science, hypotheses are continually tested and then modified or rejected as a result of experimental evidence. Similarly, in ethics, our moral judgments should continually be tested for adequacy by considering their practical implications.

Many moral philosophers utilize what is sometimes referred to as the method of reflective equilibrium. This approach is also referred to as the coherence model of justification. Whatever its label, the method seeks to test our initial moral judgments by detailing and examining the consequences of adhering to these judgments. One then tries to systematize the judgments and their consequences in a set of general moral principles that can explain and account for these judgments. These principles are themselves tested against our background theories, both moral and nonmoral. Judgments and principles that cannot be rendered consistent with each other and our background theories will need to be modified or discarded. Moreover, in this method, the testing and process of justification works in the other direction as well, that is, theories and principles are evaluated against our considered moral judgments to determine whether our more general commitments may require adjustments (hence the derivation of the term “reflective equilibrium”). Although not universally accepted, many bioethicists do follow this method (Beauchamp and Childress 2001; DeGrazia 1996) and it has the virtue of forcing us to examine critically many of our moral beliefs by considering their consequences and their consistency with our other beliefs. As we will see, this approach is very helpful in evaluating the claim that the embryo is the equivalent of a human person.

Finally, it is important that we do not lose sight of the fact that morality is a practical enterprise with certain widely shared objectives. Moral norms help us achieve a less painful, more desirable existence, by among other things, helping to provide security to the members of a community, ameliorating harmful conditions and, in general, facilitating cooperation in achieving shared or complementary goals. We need to understand the rationale of our moral norms if we are to apply them successfully. In deciding whether the embryo is entitled to equal moral consideration with autonomous humans, we need to ask ourselves whether such treatment serves the objectives of morality. Unfortunately, this is a question that few have paused to consider in the debate over embryonic stem cell research.

SCIENTIFIC BACKGROUND FOR STEM CELL RESEARCH

As indicated, a basic understanding of the science of stem cells and embryonic development is necessary before discussing the ethical implications of stem cell research.

Stem cells are unspecialized cells that have the capacity to produce more stem cells and also to produce cells that are differentiated, for example, liver cells or neurons. Stem cells are present in all stages of an organism, including the embryonic, fetal and adult stages (National Institutes of Health 2006; President's Council on Bioethics 2004; Weissman 2002).

However, embryonic stem cells have properties that are different from fetal or adult stem cells. In the early embryo (to around the five day stage), each cell is totipotent, that is, under the appropriate conditions each cell could develop into a complete, individual organism. After five days, the embryo becomes a blastocyst, consisting of an outer sphere that can develop into membranes such as the placenta and an inner cell mass that can develop into a fetus. The cells of the inner mass are pluripotent, meaning they develop into any cell type in the body, but they are no longer totipotent. Embryonic stem cells from the inner mass of the blastocyst stage are

currently the primary source of stem cells for research. One reason they are used in research is that they are considered to be more promising for work on most research projects than fetal stem cells and adult stem cells (National Institutes of Health 2006; President's Council on Bioethics 2004).

One problem with adult stem cells is that they do not appear to have the same potential to proliferate under research conditions as embryonic stem cells. Embryonic stem cells can proliferate for a year or more in the laboratory without differentiating, but to date scientists have been unsuccessful in obtaining similar results with adult stem cells. Moreover, adult stem cells are, at best, multipotent or multisomatic rather than pluripotent. Finally, and most importantly, it is still unclear whether true transdifferentiation can occur with adult stem cells, that is, it is unclear whether adult stem cells have the ability to develop into many different types of tissue as opposed to developing into different types of cells of similar tissue (Weissman 2002). For example, bone marrow stem cells can give rise to bone cells and other types of connective tissue, but do not appear capable of differentiating into other sorts of tissue.

Fetal stem cells appear to have pluripotent capacities, but these cells are at a later stage of development, which creates difficulties in using them for research. Moreover, there are ethical objections to using fetal stem cells in research as well, so it is doubtful whether there is any advantage to using them in research instead of embryonic stem cells.

In addition to understanding the differences between embryonic stem cells and other stem cells, it is also important to understand the basics of embryonic development before evaluating the ethics of stem cell research. Prior to gastrulation (when the so-called "primitive streak," the precursor to the spinal cord, appears), it is questionable whether the embryo can be considered an individualized entity. That is because until gastrulation, the embryo may develop into one or

more individuals. At least arguably, a non-individuated embryo has yet to acquire a determinate identity (DeGrazia 2006; Steinbock 2006; Green 2001).

Finally, it is important to understand the potential sources of embryos for research and the processes by which embryos can be stimulated into providing stem cells. There are two principal potential sources for embryos, namely embryos produced as a result of in vitro fertilization (or IVF) which, for whatever reason, are regarded as "spare" embryos that will not be implanted in a uterus and embryos produced through somatic cell nuclear transfer (or SCNT) (McHugh 2004; Weissman 2002).

With embryos produced in IVF, the inner cell mass is separated from the outer sphere of cells and then cultured on a plate of "feeder" cells that will maintain the stem cells through a supply of nutrients. At this time, these feeder cells are typically mouse embryonic stem cells. After the cells of the inner cell mass begin to proliferate, they are removed and plated into fresh culture dishes and, eventually, if the process is successful, an embryonic stem cell line will be established.

The SCNT procedure is different in this important aspect: SCNT is accomplished by culturing the nucleus of a somatic cell and then transferring this nucleus into an enucleated ovum. This new cell is then stimulated to divide and, when the procedure works, the cell will develop into a blasocyst with the genotype of the somatic cell donor but with the mitochondrial DNA of the ovum. After development of the blastocyst, the inner cell mass is isolated and cultured in a manner similar to that used for embryos produced via IVF.[2]

Whatever the source of the embryo, its use in research will prevent its cells from differentiating and, without differentiation, the embryo will not be able to develop into a adult human. Some refer to the isolation of the embryo's inner cell mass and use of embryonic stem

cells in research as "killing" the embryo. Whether that precise terminology is appropriate, the moral objections to embryonic stem cell research are based on the interference with the embryo's possible development that this research entails.

MORAL IMPLICATIONS OF STEM CELL RESEARCH

Benefits of Stem Cell Research

The intense interest in stem cell research reflects the potential for developing important, indeed revolutionary, therapies as a result of this research. If stem cells can be reliably directed to differentiate into specific cell types, there is the possibility of developing replacement tissues for millions of Americans who suffer from debilitating diseases and disabilities, including Parkinson's and Alzheimer's diseases, diabetes, heart disease, liver disease and spinal cord injury, to name just a few. Although there is no certainty that such therapies could be developed, the research to date appears promising. For example, dopamine-producing neurons generated from mouse embryonic stem cells have proved functional in animals, thus indicating there is a realistic possibility that similar results could be reproduced in humans, with beneficial consequences to those suffering from Parkinson's (Kim et al. 2002). Even more dramatic results were obtained recently via an experiment conducted by researchers at Johns Hopkins University. These researchers we able to use neurons derived from embryonic stem cells to restore motor function in paralyzed rats (Deshpande et al. 2006).

The moral imperative to pursue research with such potentially beneficial consequences seems clear. Alleviation of suffering and restoration of health are important goals even if only one individual is benefited. If millions of individuals may be benefited, stem cell research assumes critical importance and warrants substantial support from federal funding.

The Position That Embryos Are Entitled to the Same Rights as Human Persons

However, there are some who believe that embryos deserve the full range of rights provided to human persons and that removing from an embryo that possibility of developing the capacities and properties characteristic of human persons is morally equivalent to killing an adult human. Those who hold this view maintain we should not "harm" embryos by utilizing them in stem cell research, just as we do not kill adult humans for research purposes.

An essential premise of this position is that even though the embryo does not currently possess the capacities and properties of human persons, it possesses the potential to develop these capacities and properties, and this potential is sufficient to provide it with the moral status of a human person. On this view, an embryo is merely a human person at an early stage of development. Another essential premise of this position -- but one that is not always acknowledged -- is that the embryo is already an individual. A necessary condition for possessing moral rights is individual identity. As the President's Council on Bioethics recognizes, "individuality is essential to human personhood and capacity for moral status" (President's Council on Bioethics 2004, p. 79).We do not grant moral rights to mere groupings of cells, even if they are genetically unique.

The argument that the embryo is entitled to the same rights as human persons has been most clearly articulated and ably defended by Professors Robert George and Alfonso Gomez-Lobo, two members of the President's Council on Bioethics. In a statement that appears in the Council's 2002 report entitled *Human Cloning and Human Dignity*, Professors George and Gomez-Lobo assert that:

> A human embryo is a whole living member of the species *Homo sapiens* in the earliest stage of his or her natural development . . . The embryonic, fetal, infant . . . stages are stages in the development of a determinate and enduring entity -- a human being -- who comes into

existence as a single cell organism and develops, if all goes well, into adulthood many years later.

Human embryos possess the epigenetic primordia for self-directed growth into adulthood, with their determinateness and identity fully intact. The adult human being that is now you or me is the same human being who, at an earlier stage of his or her life, was an adolescent, and before that a child, an infant, a fetus and an embryo . . .

. . . .

Since human beings are intrinsically valuable and deserving of full moral respect in virtue of what they are, it follows that they are intrinsically valuable from the point at which they come into being. Even in the embryonic stage of our lives, each of us was a human being and, as such worthy of concern and protection. Embryonic human beings . . . should be accorded the status of inviolability recognized for human beings in other developmental stages (President's Council on Bioethics 2002, pp. 294-301).

While this position enjoys some support both among the general public and scholars, and therefore is entitled to serious consideration, it is fundamentally flawed. This position is in tension with the accepted scientific understanding of embryonic development, is based on a controversial metaphysical position, conflicts with many of our moral judgments and ultimately is unsupported by a credible theory of moral status. The position that embryos are entitled to the same moral status as human persons is untenable. Accordingly, there is no significant moral impediment to embryonic stem cell research.[3]

Objection to the View That the Embryo Is Equivalent to a Human Person: The Early Embryo Is Not an Individual

Until gastrulation, an embryo can divide into two or more parts, each of which, given appropriate conditions, might develop into separate human beings. This is the phenomenon known as "twinning" (although division into three or four separate parts is also possible). The phenomenon of twinning establishes that there is not one determinate individual from the moment of conception; adult humans are *not* numerically identical with a previously existing zygote or embryo. If that were true, then each of a pair of twins would be numerically identical

with the same embryo. This is a logically incoherent position. If A and B are separate individuals, they cannot both be identical with a previously existing entity, C.

Many of those who contend that embryos are entitled to the same rights as human persons are aware of the twinning phenomenon but they discount its significance. First, they maintain that this phenomenon does not affect those embryos that do not separate. Second, even for those embryos that undergo twinning, they maintain that this process does not undermine the claim that there was at least one individual from the moment of conception. In the words of the 2002 majority report of the President's Council on Bioethics: "The fact that where 'John' alone once was there are now both 'John' and 'Jim' does not call into question the presence of 'John' at the outset" (President's Council on Bioethics 2002, p. 177).

This reasoning is unpersuasive. Addressing first the situation where twinning does occur, if "John" was there from the beginning and "Jim" originated later, this implies that at least some twins (and triplets, etc.) have different points of origin. This anomaly creates insuperable difficulties for a view that insists all human persons come into existence at the moment of conception. Are some twins not human?

More importantly, the assertion that "John" is present from the outset -- that is, there is at least one individual present from the moment of conception -- is nothing more than a dogmatic claim masquerading as scientific fact. There is no scientific evidence to establish the presence of a "John." What the science of embryonic development shows is that the early embryo consists of a grouping of cells with a genetic composition similar to the genetic composition of adult humans and that, after a period of time, these cells begin to differentiate and to organize themselves into a unified organism. Prior to gastrulation, there is no certainty that these cells will differentiate and organize nor is there any certainty that these cells will become one, two or more

individuals. In the words of the Human Embryo Research Panel, the cells of an early embryo do not form part "of a coherent, organized, individual" (HERP 1994, p. 9). The phenomenon of twinning confirms that they early embryo is not a unified, organized, determinate individual. To insist otherwise is to maintain -- without any supporting evidence -- that there must be some occult organizing principles which we have not yet been able to detect. Effectively, the position that there simply must be a determinate individual from the moment of conception is a restatement of ancient ensoulment views in modern dress.[4]

Objection to the View That the Embryo Is Equivalent to a Human Person: The "Potential" of the Embryo Does Not Make It a Human Person

The fact that the early embryo is not an individual has obvious implications for the argument that the embryo is entitled to protection because it possesses the potential to develop capacities and properties characteristic of human persons. We cannot refer meaningfully to the potential of the embryo if it is not yet an individual.

However, even leaving the phenomenon of twinning aside, the argument from the potential of the embryo is not cogent for several reasons. The possibility that an embryo might develop into a human person does not obviate the fact that it has not yet acquired the capacities and properties of a person. An embryo is no more a human person than an acorn is an oak tree. Not only do embryos lack consciousness and awareness, but they do not have experiences of any kind, even of the most rudimentary sort. As already indicated, they have not even undergone cell differentiation.

Those who oppose embryonic research often try to minimize the gap between potential and actual possession of the characteristics of a human person by suggesting that the embryo's path of development is inevitable. They assert that the embryo has the same genetic composition

as the human person it will become and these genes provide it with the intrinsic capability of developing into that human person. But this suggestion overlooks the important role that extrinsic conditions play in embryonic and fetal development. Those who claim full moral status for the embryo seem to regard gestation within a woman's uterus as an inconsequential and incidental detail. Obviously, it is not. The embryo must be provided with the appropriate conditions for development to occur. The embryo does not have the capability of expressing its "potential" on its own.

Recognition of this fact has special relevance in the context of the debate over stem cell research because of the two possible sources of embryonic stem cells, namely spare embryos from IVF procedures and embryos created from SCNT. In neither case are the embryos being removed from conditions that might permit their development. The spare embryos from IVF procedures have not been and will not be implanted in a uterus; instead, they will either be stored for an indefinite period or discarded. Therefore, they have no prospect of developing into a human person. Their potential is no more than a theoretical construct.

The lack of any real potential to develop into a human person is even clearer in the case of embryos that might be created through SCNT. These embryos will be created with the specific intention of being used solely for research. Therefore, unless they are misappropriated by some pro-embryo activist and covertly implanted in a uterus they have absolutely no chance of developing into a human person. It is misleading to speak of the potential of embryos to become human persons when the likelihood of such an event approaches zero.

Furthermore, the creation of embryos through SCNT shows that the argument from potential proves too much. Through SCNT, a somatic cell is allowed to express its potential to be transformed into an embryo that is latent in its genes but has been suppressed. If gene-based

potential to develop into a human person is sufficient to provide an entity with full moral status, then each somatic cell in a human person's body has the same moral status as the person herself. This conclusion constitutes a *reductio ad absurdum* of the argument from potential; among other things, it would make even standard organ donation morally unacceptable.

Objection to the View That the Embryo Is Equivalent to a Human Person: The Unacceptable Consequences of This View

The conclusion that all the cells in a person's body possess the same moral rights as the person herself is just one of the unacceptable conclusions that follow from granting embryos the status of human persons. These unacceptable consequences demonstrate that granting full moral status to the embryo is not compatible with widely accepted moral norms and principles.

One important fact about embryonic development that is often overlooked is that between two-thirds and four-fifths of all embryos that are generated through standard sexual reproduction are spontaneously aborted (President's Council on Bioethics 2004). If embryos have the same status as human persons, this is a horrible tragedy and public health crisis that requires immediate and sustained attention. Up to eighty percent of humanity is at risk of dying suddenly. Not only should we abandon stem cell research, but we should reroute the vast majority of our research dollars from projects such as cancer research into programs to help prevent this staggering loss of human life. How can we have been so morally obtuse that we have failed to heed the silent cry of the millions of embryos that "die" each year?

Interestingly, none of the opponents of embryonic stem cell research have called for research programs that might increase the odds of embryo survival. Their failure to address this issue is puzzling if the embryo deserves the same moral respect as human persons. Consider that great strides have been made in reducing infant mortality in the last century. Why do the

opponents of embryonic stem cell research not demand that similar efforts be made to improve the survival rate of embryos?

Similarly, IVF would appear to be morally objectionable regardless of whether some embryos produced by this procedure are used in research. Those who utilize IVF intentionally create many embryos that they know will be discarded eventually. How can we accept a process that consigns entities that supposedly have the status of human persons to the rubbish bin? Hypotheticals can sometimes prove useful in testing our moral judgments. Consider what our moral reaction would be if we had a process that generated not embryos but infants at a developmental stage of about six months. Would we regard this process as morally acceptable if the vast majority of infants so generated were thrown away? Presumably not. Indeed, many would find such a process repugnant. But if embryos have the same status as human persons, then a similarly repugnant result is produced by current IVF procedures.

Finally, it is worth noting that the focus of the current controversy over stem cell research is whether it should be federally funded, not whether it should be banned entirely (although there are some who have called for a ban). That we are even debating the wisdom of federal funding demonstrates that most of us do not consider the embryo to have the same status as a human person. We do not debate the pros and cons of federal funding of research that would destroy adult humans.

Consideration of these implications of the position that embryos are entitled to the same rights as human persons demonstrates that this position cannot be reconciled with widely accepted moral norms and principles. Of course, this does not "prove" that this position is morally unsound. It is always open to advocates of this position to argue that our accepted moral

norms and principles are in need of radical reform. However, to date no such call for a moral revolution has issued from those who regard embryos as the equivalent of human persons.

Objection to the View That the Embryo Is Equivalent to a Human Person: The Failure to Provide an Adequate Theory of Moral Status

In our last objection, we note that those who insist that the embryo has the same moral status as a human person fail to articulate an adequate theory of moral status. In other words, they fail to identify which capacities or properties, intrinsic or relational, qualify an entity for moral respect. For example, is it rationality, the capacity for moral agency, sentience, social relationships or some combination of these that constitutes a necessary or sufficient condition for moral status?

The defenders of full moral status for the embryo typically rely solely on the assertion that humanity entitles one to full moral status and that the embryo is fully human in light of its genetic composition (President's Council on Bioethics 2002, pp. 294-301). There are several problems with this claim, however.

To begin, if humanity is a necessary condition for moral status, then this would preclude granting moral status both to nonhuman animals and to extraterrestrials who exhibit capacities such as rationality or moral agency. Without further argument, this would appear to be an arbitrary exclusion. Certainly, such entities appear to have interests (including the desire to be free from pain or distress) similar to human interests that are fostered or protected by our moral norms.

If humanity is a sufficient but not a necessary condition for moral status, then what is it about humanity that entitles one to moral status? No explanation is offered by those opposed to embryonic stem cell research other than the biological criterion of human genetic composition.

However, unless a rationale is provided that explains *why* human genetic composition is so critical, then the insistence that genetic humanity is the key to moral status in mere question-begging.

Furthermore, insistence that genetic humanity is the key to moral status has disturbing implications. It is often overlooked that not all embryos, fetuses or children produced by human parents have the same number of chromosomes. Humans typically have 23 pairs of (or 46) chromosomes. However, some embryos, fetuses and children have extra chromosomes. Cells that have an irregular number of chromosomes are called aneuploid. Most embryos with aneuploid aberrations are spontaneously aborted, but some can survive. Down syndrome children, for example, have an extra chromosome 21. If genetic composition is what is critical for being a true human and enjoying full moral status, what do we say about Down syndrome children or children with other aberrant chromosomal composition? If they are entitled to full moral status, then genetic composition cannot be the sole determinant of moral status, but if it is not the sole determinant, what other factors are relevant and how would these other factors affect the status of embryos? To date, no proponent of the view that embryos are entitled to full moral status has confronted or answered these questions. But without answers to these questions, the claim that the embryo is equivalent to a human person cannot be adequately supported.

Critics might say that it is incumbent upon those who defend embryonic stem cell research to provide their own theory of moral status. We accept the validity of this point. Although it is not possible to provide anything resembling a thorough and definitive argument for a theory of moral status within the confines of this article, we will provide the following outline of the elements of such a theory: We maintain that the scope of morality, which is a set of practices that ultimately relies on reason instead of force, should presumptively include all

beings who are capable of reasoning and, therefore, capable of being influenced by moral norms. (This provides the underlying rationale for the intuition that rationality or moral agency is important for moral status.) Moreover, we should not lose sight of the fact that morality has objectives, one of which is to ensure the survival of the moral community, including oneself and one's loved ones, which, for most of us, includes our children. Our children embody our hopes and aspirations and assuming a moral community has a desire to survive for more than one generation, its children are they key to its survival. So children who are wanted and intentionally gestated are entitled to the protection of our moral norms even when they are too young to be capable of reasoning. However, embryos that are designated for research use are, by definition, not entities that are, or have the potential to become, children and members of the moral community. Nor do they possess consciousness or rationality or any of the other characteristics that might entitle an entity of membership in the moral community.[5] Accordingly, the fact that their genetic composition may be similar to members of the moral community does not, by itself, entitle these entities to the protections of our moral norms.

Indeed, our legal and cultural norms have long distinguished among those that are entitled to the full panoply of rights, and held to account for duties, based upon commonly understood concepts of reason, consciousness, agency and autonomy. These norms serve as reasonable baselines for future norms, even while being themselves subject to revision over time. The notion that an embryo is somehow subject to human rights and duties is completely novel, unsupported philosophically, historically, or culturally, and thus subject to much greater scrutiny and doubt. This claim simply has not been supported by rational argument and should be rejected until such time as better arguments might be made.

CONCLUSION

The primary objection to government funding of embryonic stem cell research is that the embryo is inviolable because it has the same moral status as a human person. While this position is maintained by a number of persons, including some respected scholars and scientists, this position cannot withstand critical scrutiny. For the reasons set forth in this article, the early embryo lacks moral status and there is no moral barrier to its use in research, especially research that can produce immense benefits for millions of ill, injured and suffering persons. Embryonic stem cell research merits the financial support of the federal government.

ENDNOTES

1. We use the term "human person" to designate an entity who presumptively has full moral status and is entitled to the full complement of moral rights. There are debates within ethics and bioethics whether "human being," "person," or "moral agent" is the appropriate category for the assignment of moral rights. In addition, of course, there are those who maintain that all sentient beings (that is, both humans and nonhuman animals) are entitled to equal moral consideration. Resolution of these controversies lies outside the scope of this article. In using the category "human person," we simply acknowledge the reality that most humans are recognized as having moral rights and that these rights are often associated with certain capacities, such as consciousness and rationality. Use of this term does not exclude the possibility that embryos might be entitled to the full complement of moral rights as well, whether or not they can be appropriately characterized as human persons. In short, we are using neutral terminology that allows the moral status of embryos to be resolved by argument, not semantics. By contrast, some of those who oppose embryonic stem cell research limit themselves to asserting that the embryo

has the genes of a human, that humans are entitled to moral rights and that, therefore, embryos are entitled to moral rights. This is tantamount to trying to resolve a moral dispute through stipulation.

2. It is important to note that to date SCNT has not been successfully used to generate a human embryo, at least not in any independently confirmed experiment. However, researchers at various universities have recently committed to begin experiments with SCNT to create human embryonic stem cell lines, using private funding (Harvard University 2006).

3. In focusing on the argument that the embryo cannot be used in research because it is equivalent to a human person, we are not ignoring the fact that there are other possible objections to embryonic stem cell research, including whether it can be appropriately regulated or will inevitably lead to even more troubling scientific research, such as cloning for reproductive purposes (the so-called "slippery slope" argument). However, we believe it is fair to say that the most prominent and widely accepted objection to embryonic stem cell research (certainly it was the one emphasized by President Bush in his veto message) is that it harms embryos.

4. The justification for granting moral status to the embryo based on ensoulment has been itself subject to significant debate over time and among theologians. Prevailing Christian doctrine for the period from the fifth to the seventeenth centuries was that of "delayed ensoulment," because a soul was presumed to need a separate human body. Abortion was thus tolerated, consistent with Old Testament principles which punished abortion with a fine.

5. Some, especially those who argue in favor of moral rights for nonhuman animals, maintain that sentience is sufficient to entitle an entity to moral status. We do not need to take a position on this particular issue as it is undisputed that the embryo is not sentient.

REFERENCES

Beauchamp, Tom L., and Childress, James F. 2001. *Principles of Biomedical Ethics*. 5th ed. New York: Oxford University Press.

DeGrazia, David. 2006. Moral Status, Human Identity, and Early Embryos: A Critique of the President's Approach. *Journal of Law, Medicine & Ethics.* 34: 49-57.

_____.1996. *Taking Animals Seriously: Mental Life and Moral Status.* New York: Cambridge University Press.

Deshpande, Deepa et al. 2006. Recovery from Paralysis in Adult Rats Using Embryonic Stem Cells. *Annals of Neurology*. 60: 22-34.

Green, Ronald M. 2002. *The Human Embryo Research Debates.* New York: Oxford University Press.

Harvard University. 2006. *Approval Granted for Harvard Stem Cell Institute Researchers to Attempt Creation of Disease-Specific Embryonic Stem Cell Lines.* Available at http:www.news.harvard.edu/gazette/daily/2006/06/06-stemcell.html. (Accessed 21 July 2006.)

Human Embryo Research Panel, National Institutes of Health. 1994. *Report of the Human Embryo Research Panel,* vol. 1. Bethesda, MD: NIH.

Kim, J-H. et al. 2002. Dopamine Neurons Derived from Embryonic Stem Cell Function in an Animal Model of Parkinson's Disease. *Nature*. 418: 50-56.

McHugh, Paul R. 2004. Zygote and "Clonote" - The Ethical Use of Embryonic Stem Cells. *The New England Journal of Medicine.* 351: 209-211.

President's Council on Bioethics. 2004. *Monitoring Stem Cell Research.* Available at http://www.bioethics.gov/reports. (Accessed 17 July 2006.)

_____. 2002. *Human Cloning and Human Dignity.* New York: Public Affairs.

President's Remarks on Stem Cell Research Policy. 2006. Available at http://www.whitehouse.gov/news/releases/2006/07/print/20060719-3.html. (Accessed 23 July 2006.)

National Institutes of Health. 2006. *Stem Cell Basics.* Available at http:stemcells.nih.gov/info/basics. (Accessed 13 July 2006.)

Steinbock, Bonnie. 2006. The Morality of Killing Human Embryos. *Journal of Law, Medicine & Ethics.* 34: 26-34.

Weissman, Irving L. 2002. Stem Cells - Scientific, Medical and Political Issues. *The New England Journal of Medicine*. 346: 1576-1579.