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The Moral Issues of Embryonic Stem Cell Research, and Their Potential Solution

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Abstract:

Embryonic stem cell research is on the frontiers of medicine as of late and holds the potential for improving practices such as organ donation and drug testing. However, the procedures involved in embryonic stem cell research are rooted in moral dispute. Many uphold that this practice is morally impermissible due to the fact that it results in the destruction of human embryos. Additional problems arise when it comes to determining the moral status of the human embryo and the risks posed to donor women throughout the process. Arguments exist over when a human embryo should be awarded moral status, if at all, and those considering the debate from a religious standpoint are also dubious of the moral implications of embryonic stem cell research. I examine these various faults in the argument for embryonic stem cell research throughout this paper, and offer up an alternative solution. Induced pluripotent stem cell research, although a relatively new advancement in medicine, may provide the medical community with a way in which to avoid many of these issues. The key feature behind this innovation lies in the fact that human embryos are not destroyed or acted upon throughout the procedure, and research could be conducted with the use of skin cells instead. I contribute to the discussion on the stem cell debate throughout the paper by considering a range of moral arguments and concerns not often considered, and with a few of my own responses to common objections made to induced pluripotent stem cell research.
Introduction

Stem cell research has been at the forefront of philosophical debate for the past few years, due to the morally questionable method of using embryonic cells for research purposes. Embryonic stem cell research has been criticized across the board because the processes used to obtain these wonder cells ultimately result in the destruction of human embryos. Additionally, the use of such cells prompts philosophers as well as scientists to consider the moral status of the human embryo, and whether or not this status evolves as the embryo develops. Complications also arise when it comes to the matter of cloning and the commodification of embryos, as well as the well-being of the donor women. I propose the use of induced pluripotent stem cells to help sidestep the ethical dilemmas brought up by embryonic stem cells, due to the fact that they provide a feasible solution to each of the aforementioned problems.

Key Terms

According to the National Human Genome Research Institute, embryonic stem cells are a class of unspecialized cells that are found within human embryos. The embryos used for obtaining stem cells do not originate from inside women, but are the products of in vitro fertilization in laboratories. As the embryonic stem cells develop, they are capable of specializing into the various types of cells found throughout the body. This ability has sparked the interest of scientists around the world, who see the potential for these cells to be used within regenerative medicine as an alternative to risky organ transplants.

Induced pluripotent stem cells, on the other hand, are not derived from human embryos. They originate from adult cells, which are harvested by scientists and
genetically reprogrammed to take on an embryonic-like state ("Stem Cell Basics", 2009). After reprogramming, these adult cells gain pluripotency, which is the ability of a cell to differentiate into every type of tissue found in the body ("Stem Cell Information", 2012). Scientists have started to use induced pluripotent stem cells in order to model diseases such as Parkinson’s disease, and have used them to test drugs that have not yet found a place on the market ("Stem Cell Information", 2012).

The Morality of Embryo Destruction for Research Purposes

As one would expect, the main ethical problem surrounding embryonic stem cell research has to do with the processes involved in harvesting the cells. Embryos are destroyed as a result of the procedure, and many label this as a morally impermissible result, likening it to the issue of abortion. Many believe that embryos qualify as human life in and of themselves, and therefore, it is wrong to bring about their destruction despite how great a resource they may be for the medical community. This viewpoint has been labeled before as the “Moral-Principle Objection” (Marquis, 2007). Additionally, those against embryonic stem cell research also hold the belief that embryos are highly symbolic of human life, and that alone qualifies them for better treatment than they are given and for protection against destruction (Master & Crozier, 2012).

Those in opposition to the aforementioned problem maintain that because embryonic stem cells can be obtained from frozen samples, they do not qualify as life. To some, embryonic stem cells are not considered to be deserving of ethical treatment if they do not display the signs of life. Opponents of the Moral-Principle Objection, according to Don Marquis, also claim that, “we don't know when life begins and that therefore to hold that life begins so soon after conception is mere dogma” (Marquis, 2007). Building off of
this perspective, others argue that because an embryo cannot develop into a human being without being inside a woman’s uterus, it does not qualify as an actual human being. In other words, they believe that, “something that could potentially become a person should not be treated as if it actually were a person” (Hug, 2011).

**Determining the Moral Status of the Embryo**

The question of whether embryonic stem cells have a moral status, and whether this status increases with the development of the embryo, proves to be another road block. Those that support the viewpoint that embryonic cells have a moral status as soon as fertilization takes place would be in agreement with the Moral-Objection Principle and its tenets. They maintain that, “A human embryo is a human being in the embryonic stage, just as an infant is a human being in the infant stage,” (Hug, 2011).

Others uphold that the moral status of the embryo increases with development, starting from just after fertilization and leading up to birth where there would be a full moral status assigned. Those in favor of this belief tend to agree with the statement that, “if a life is lost, we tend to feel differently about it depending on the stage of the lost life,” (Hug, 2011). Additionally, proponents of the developmental moral status viewpoint uphold that because a large percentage of fertilized eggs are lost naturally, it should not be a problem if scientists use a portion in research (Hug, 2011).

However, some believe that the human embryo deserves no moral status. Those that argue this perspective claim that because a blastocyst does not exhibit the same emotions and desires that we do as developed humans, we are doing no harm by collecting their stem cells and destroying them. Proponents of this side of the argument prefer to view embryonic stem cells as property, rather then as a person (Hug, 2011).
Those in opposition with the developmental moral status viewpoint maintain that, “if we are not sure whether a fertilized egg should be considered a human being, then we should not destroy it,” (Hug, 2011). Similarly, they uphold that judging embryonic stem cells by their age is faulty, because if we were to assert that moral status should be assigned as soon as certain body systems are functional, we would be leaving out those who suffered damage or losses to those systems (Hug, 2011).

**Opening the Door to Cloning and Embryo Commodification**

Another worry that some have in regards to embryonic stem cell research is that it will lead us towards a world similar to one imagined by Aldous Huxley, where the farming of human embryos is commonplace and the cloning of babies is no longer deemed immoral (“Embryo Ethics”, 2004). They tend to uphold that if we do not find a problem with destroying a human embryo, it may lead us on to pursue further immoral acts in the name of science. Additionally, the idea of producing embryos for stem cell research bothers some because they believe it might cause embryos to become tools for economic gain. They fear that society will change its views on procreation, and embryonic stem cell development will “cheapen the value of parenting” as well as “ trivialize the act of procreation” (Robertson, 1999). This trepidation stems from the potential concept of producing embryos just for the sake of research and embryonic stem cell gathering.

**The Potential Risks to Donor Women**

The morals of embryonic stem cell research become even more convoluted when it comes to the topic of the safety of donor women. In order to obtain eggs for laboratory stem cell research use, female donors are needed. According to Dr. Diane Beeson’s
research, women across the nation are undergoing surgeries to donate their egg cells that
tend to put their bodies under a great amount of stress. Several eggs are being taken
during each procedure, and these procedures have been labeled as being “invasive” and
“uncomfortable” (Beeson & Lippman, 2006).

To make matters worse, women often suffer side effects from the hormones used
to stimulate their ovaries, and the long term effects of these hormone treatments have not
been thoroughly studied. Additionally, research is lacking when it comes to how
stimulating the ovaries of these women will affect children they may have. Studies with
mice have shown that the same procedures highly affect offspring in a negative manner,
and these mice often gave birth to babies with “several significant abnormalities”
(Beeson & Lippman, 2006).

**Induced Pluripotent Cells: A Potential Ethical Solution**

With these road blocks in mind, it seems very difficult for embryonic stem cell
research to take ethical steps forward. However, with the advent of induced pluripotent
stem cells, potential solutions to these ethical and moral issues may already be at hand.

The concern of embryo destruction that is so central to the argument against
embryonic stem cell research is not a problem in terms of induced pluripotent stem cells,
which removes a large portion of ethical worries. Due to the fact that induced pluripotent
cells originate from adult cells such as fibroblasts, embryo use and destruction would be
out of the question (“Stem Cell Basics”, 2009). Dr. Shinya Yamanaka, the scientist who
pioneered the induced pluripotent procedure, has been quoted as saying, “neither eggs nor
embryos are necessary. I’ve never worked with either” (Carvalho & Ramalho-Santos,
2013).
The difference in biological age and ability that induced pluripotent stem cells have resolves the additional ethical setback of embryonic moral status. Although one could make a fair argument that induced pluripotency would cause society to consider the morality of reprogrammed cells, I maintain that it would not have nearly the same ethical scope that determining the morality of a human embryo does. I uphold that most citizens would recognize the distinction between the cells being used in each procedure, and would understand the great relevance in the difference of their origins.

As far as the issue of human cloning and the fear that embryonic stem cell research will lead to embryos being commodified and grown en masse to suit our needs goes, induced pluripotent techniques bypass this issue also. No embryos are needed for the process, and the only cells needed would be those already found in the adult human body. There would be no need for the embryo farming that some have imagined, because induced pluripotent procedures have the potential to form organs as well. These organs differ, though, because they have no risk of rejection with the patient due to the fact that they have been crafted from the patient’s own specific cells ("Stem Cell Basics", 2009). Once this ability is harnessed by scientists, some may still worry about organ farming and the possibility of cloning.

Fortunately, with the advent of induced pluripotent stem cells, women would not have to undergo potentially dangerous ovarian stimulation procedures in order to fuel the research on the basis that these cells do not require human embryos ("Stem Cell Basics", 2009). Induced pluripotent cells are heralded for their potential in regenerative medicine due, in part, to their ability to form a perfect match with a patient’s cells ("Stem Cell Basics", 2009). With this in play, the only “donor” needed would be the patient.
Compared to the donation procedure women undergo, the method of obtaining the cell materials needed to engineer pluripotent cells has been deemed “a safer and less invasive alternative” (Zacharias et al., 2011). Induced pluripotent cells also have the ability to provide scientists with limitless material after the introductory biopsy is made. This contrasts sharply with embryonic stem cells, which require several cell lines and donations (Zacharias et al., 2011).

**Objections to Induced Pluripotency**

The most prominent objection to the use of induced pluripotent cells in the manner that I have described is that, in order for pluripotent research to continue onwards, embryonic stem cell research is required (Brown, 2013). According to Mark Brown, induced pluripotent technology is rooted in the study of human embryos, and progress made in the induced pluripotent field will be linked to embryonic stem cell research. He upholds that, although reprogrammed cells do have the potential to put an end to embryonic cell usage and provide doctors with tools needed to treat patients in a way never seen before, we are not there yet. In order to get there, Brown states, it will take further comparative research between reprogrammed cells and embryonic stem cells.

I do concede that this objection will be a stumbling block down the path of induced pluripotent stem cell research. If it is considered morally impermissible to bring about the destruction of embryonic stem cells, it should follow that destroying a select few lines for the sake of research should be considered equally as impermissible. However, if society is to reach the point where the destruction of embryos is no longer needed to make life-saving medical breakthroughs, something must be done. I maintain that the usage of cells from unsuccessful fertility treatments could be an option, so long
as the cells in question were bound to be discarded anyway. The research and data behind induced pluripotency seems too good of an opportunity to change the face of regenerative medicine to give up on, simply because it will require comparative analysis of embryonic cells.

An additional objection that some raise in regards to induced pluripotency is the risk of tumor development. The process of reprogramming somatic cells is thought by many to still be in early stages, and there are still risks associated with the use of these cells (Zacharias et. al, 2011). Some could make the case that it would be immoral to use this technology until it is perfected so that a patient receiving treatment for a certain disease does not end up with tumor development.

I agree that it would be immoral and unethical to administer patients with cells that may cause an additional problem such a tumor development. Fortunately, research is underway to show that reprogrammed cells can be treated so that genes that tend to cause the creation of a tumor are removed after the reprogramming is done (Zacharias et. al, 2011). I do not have the capability of saying whether or not this issue will be ironed out in a decent amount of time so that cell therapy can become a reality, though. Time remains an issue with induced pluripotent stem cells, although perhaps with some sort of government funding on the basis that adult pluripotency is far more patient-friendly, moral, and ethical than embryonic stem cell research, issues such as this can be resolved.

Others object to the use of induced pluripotent stem cells on the basis that they could be used to generate a human embryo, and claim that this would be highly immoral (Zacharias et. al, 2011). The problem with cloning that embryonic stem cell research creates still lingers with adult reprogrammed cells, some maintain. After all, induced
pluripotent cells do hold the potential for scientists to replicate and grow organs and tissues ("Stem Cell Basics", 2009). It would not be out of the ordinary for some to fear the possibility of organ farms and cloning as a result of induced pluripotency, as they do for embryonic stem cell usage.

I uphold that while experts have claimed that it is possible for one to use induced pluripotent stem cells to reproduce human embryos, it has been said that reproducing an embryo via induced pluripotent stem cells would be very abnormal, and not something anyone would actively do unless they were some sort of “maverick” (Zacharias et. al, 2011). As far as the fear of organ farming and cloning goes, I reject this notion on the basis that organ farms with induced pluripotent cells would most likely be very useful for therapies, and would not qualify as immoral because they would not be obtained through the destruction of embryos. Additionally, considering the lack of risk for organ rejection, these organs would probably be put to use in transplant surgeries. Due to the fact that patients would not be put in the position where the organ could not be accepted, this seems to be morally permissible.

On the subject of cloning, and the fear that some hold that stem cell research may cause us to pursue further immoral actions, I believe that government policies will most likely forbid scientists from attempting to create a human from induced pluripotent stem cells. It would not be out of the range of reason to assume this, considering the numerous policies and laws in existence that address the restriction of human cloning in general ("Laws and public," 2009). In addition, induced pluripotent cells do not have the ability to give rise to an entire organism on their own, unless they are programmed to do so
(Donovan & Gearhart, 2001). Government policy could be formed to restrict this capability if it were necessary.

Induced pluripotent stem cell use and research, I concede, is not a perfect solution to every moral and ethical dilemma posed. However, it seems to be the most promising option at hand, with the potential to provide patients with personalized treatment and scientists with the ability to test drugs safely, all without the ethical risks of embryonic stem cell research. I do not have the professional capability to affirm that induced pluripotent stem cells are the ideal solution to all or even most of the ethical and moral problems surrounding stem cells in the nation, but through my research it appears to be the most valid solution that could be at hand, from a student’s perspective.
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