Abstract

With the increasing use of stem cells in research, discussion surrounding the use of embryos for the derivation of stem cells has often been the cause of heated debates. After defining stem cells and exploring methods to obtain them, support for their use in research is shown through both Kantian and utilitarian ethical theories. Under the Kantian perspective, egg donation for stem cell research is done autonomously, with informed consent, and the embryo is not considered a rational being that we have a duty to protect. Stem cell research represents the imperfect duty of beneficence, to use embryos that would otherwise go unused in order to help others, and the imperfect duty to develop our talents, as stem cell scientists push forward the frontiers of developmental biology and regenerative medicine. The utilitarian perspective generally argues for maximizing happiness and minimizing suffering. Here, the small investment in the use of embryos proves appropriate given the absence of suffering on the part of the embryo and the vast potential gain in happiness and wellbeing that may be attained directly through stem cell research. A limiting factor in this situation is a lack of viable eggs, caused by public policy that prohibits egg donor compensation beyond incurred expenses. The resulting failure to fairly compensate egg donors for this strenuous and time-consuming procedure makes it challenging to find willing donors. We can resolve this issue by altering policy to allow for egg donor compensation equal to that which egg donors receive in fertility clinics.

Keywords: donor compensation, egg, embryo, ethics, Kant, Mill, stem cells.

Introduction

Since the advent of stem cell use in research, discussion surrounding the use of embryos to derive stem cells has sparked heated debates. Proponents of stem cell research speak of them in hopeful terms, describing enthusiastically the benefits and possibilities of developing our knowledge while opponents warn of crossing the line into immoral territory and often depict the use of the embryo as evil, akin to murder.

Part I of this paper is a primer describing embryonic and induced pluripotent stem cells, how they are derived, and provides a comparison of
that they have not taken on the morphological or genetic changes that are characteristic of differentiated cells; rather, they remain in a ‘flexible’ state. Stem cells are capable of long-term self-renewal, which means that they can continue to divide and regenerate themselves indefinitely (Figure 2) (Evans, 2011). Given the right conditions, stem cells may also be encouraged to differentiate to, or give rise to, other cell types. Researchers commonly encourage the differentiation process through the addition of cellular growth factors or through other manipulations of the cellular environment (Slack, 2012).

The property of cell potency describes the range of cell types that a given stem cell has the ability to become. Cell potency varies by stem cell type, resulting in different classifications of potency. Embryonic stem cells and induced pluripotent stem cells are called pluripotent because of their ability to differentiate into any tissue type of an organism besides the trophectoderm (Stem Cell Basics, 2009). The human body houses stem cells in multiple locations that are multipotent, or capabilities are limited to progeny of particular cell types. For example, hematopoietic stem cells give rise to all types of the blood cells in the body.

**How are human embryonic stem cells derived?**

In the majority of cases, human embryonic stem cells are created with unused embryos remaining from an in vitro fertilization (IVF) clinic. For the in vitro fertilization process, the female receives fertility medication to stimulate egg production. Usually as many mature eggs as possible will be extracted because once removed, not all eggs will develop as intended. An egg is then introduced with sperm in the insemination event, creating an embryo. The embryo is allowed to develop for three to five days before it is transferred into the woman’s uterus. In order to be successful, the embryo must implant in the uterine wall and sustain implantation. About 30% of
Comparing stem cell type: iPSC are similar but not equivalent to ESCs

In 2006, Shinya Yamanaka and Kazutoshi Takahashi published the first paper describing a process for taking mouse somatic cells, tissue of the adult organism, and converting them into pluripotent cells, which he deemed “induced pluripotent stem cells” (iPSCs)(Takahashi & Yamanaka, 2006). In the following year, a similar study by James Thompson of the University of Wisconsin-Madison described accomplishing induced pluripotency with human cells, creating the first human induced pluripotent stem cells (hiPSCs) (Vodyanic et al., 2007).

One advantage of hiPSCs is that scientists may use a patient’s tissue to generate stem cells, convert the stem cells into a tissue the patient needs and then transplant the tissue into the patient, avoiding immunorejection. iPSCs allow researchers the ability to study patient-specific diseased cells and test the effects of drug treatments on patient tissue to help in the development of patient-specific therapeutic options.

Initially, it was thought that iPSC would be a replacement for the use of ESC, circumventing the ethical concerns of ESC use by replacing them with iPSC. Prima facie iPSC appeared to be a solution to the ethical concerns of deriving ESCs. In 2009, several publications identified dissimilarities between iPSCs and ESCs in gene expression, epigenetic signature, mutation load, and differentiation capacity, suggesting that iPSC are not equivalent to ESC, cannot serve as a replacement in all cases (Chin et al., 2009; Machetto et al., 2009; Ghosh et al., 2010; Bilic & Belmonte, 2012).

In their review of iPSCs vs ESCs, Bilic & Belmonte identify three emerging differences between the cell types:

- So far, all experiments point to three major characteristics when focusing on the distinction between iPSC and ESC. One is the aberrant silencing of somatic genes in cells undergoing reprogramming, another is the weak activation of ESC specific pluripotency genes, and the third are unspecific aberrations distinct from either the cell of origin or ESC.

- According to George Daley, “iPS cells and ES cells are neither identical nor distinct populations. Instead, they are overlapping, with greater variability inherent within each population than between the populations.”

These differences represent imperfections present in iPSC that are being reduced as reprogramming protocols are improved and refined. However, it appears that iPSC may retain a genetic memory of the previous cell state and it is not clear that this memory can be completely removed. Until a way is discovered to remove the genetic memory from an iPSC, which would allow iPSC to match ESC in quality, ESC remains the gold standard for use in stem cell research. While iPSC serve many purposes, they are not an equivalent replacement for ESC at this point (Robinton & Daley, 2012).

Part II: Intention & Consequence

Kantian and utilitarian approaches are utilized to advocate the use of iPSC and ESC in stem cell research. I show these traditional ethical theories uphold and support both the intentions and consequences of embryonic stem cell research. These theories are used to explore common religious objections, and show that the secular counterparts to these arguments fail to hold up against criticism. This work suggests public policy should follow the Kantian and Utilitarian conclusions.

Kantian View on Stem Cell Research

Eighteenth century Prussian philosopher Immanuel Kant sought to define moral acts as objectively right or wrong in all situations. In doing this, he created three formulations of the categorical imperative based upon the premise that the motivation or intention behind the action is what determines the action’s morality. Therefore, the categorical imperative formulas may be used interchangeably as they are designed to lead to the same conclusions regarding the intention of one’s actions.

The first of his three formulations addresses the principle of universalizability which states that we should, “Act only on that maxim through which you can at the same time will that it should become a universal law” (Schoenecker, 2013, p. 24). Here, Kant explains that we must only act with an intention that we could wish everyone abided. In his second formulation, Kant explains we should intend to treat one another as an end and never as merely a means. The third formulation states that we have a duty to legislate in accordance with the first and second formulations.

A maxim is tested against the categorical imperative, if it passes the test it becomes what Kant refers to as a duty. Kant describes a duty by our ability to follow it, and defines duties as perfect and imperfect. A perfect duty is a duty we have a responsibility to abide to without exception such as not to lie, or to not commit suicide. An imperfect duty is distinct from a perfect duty since it is right to follow, but we are limited in extent or ability to complete it. Kant names two imperfect duties explicitly: beneficence and to develop our talent.
Regarding stem cell research, some people claim there is a perfect duty to protect the embryo from destruction. However, Kant describes a rational being as capable of acting autonomously and granting informed consent (Pojman, 2003). The embryo fails to possess these qualities, making these areas, as far as a Kantian would be concerned, a non-issue.

The embryo does not exist as a rational being, however it is often granted protection for a different reason. Some argue that pre-implantation embryos should be protected because of a similarity to what are called “persons in the extended sense”, this description includes individuals such as children, who are not yet rational beings but have the potential to develop into them, or an adult who has temporarily lost the capacity for rational thought (Wood, 2005, p. 317). If we examine a central component to rational thought-brain development—we find clear differences between the pre-implantation embryo and to individuals we may grant as persons in the extended sense, such as children.

The preimplantation embryo lacks any neuronal tissue whatsoever which makes brain activity, a prerequisite for rational thought, impossible. Children or temporarily incapacitated rational beings may not be rational thinkers at the time, but the central nervous system, which includes the brain and spinal cord, has been established. This nervous tissue is requisite for the production and development of rational thoughts. The embryo has never had these features, and will only develop them provided it is removed from its culture dish and is successfully implanted into the uterus of a woman, because of these developmental obstacles, we should not consider the embryo to be a person in the extended sense.

It can be argued that an embryo is a person in the extended sense because it has the ability to develop into a human. This is one outcome; however, the cells of the embryo may also remain as stem cells or be guided to become tissues of a certain cell type by the same developmental mechanisms that would allow the embryo to become human. To say that the preimplantation embryo is destined only to become a human being at this point denies a range of possible outcomes.

Should we reject the notion of the embryo as a person in the extended sense, we are not required grant protection against its destruction. This is not to say that the embryo is lacking any or all moral worth, but it is making a distinction on how we characterize and treat the pre-implantation embryo at this point. Furthermore, imperfect duty of beneficence to the health of individuals may be considered in support of the utilization of stem cells in research.

**Utilitarian Background**

The utilitarian viewpoint aims to approach the realm of ethical decisions by considering a kind of cost-benefit analysis. In Utilitarianism, John Stuart Mill explains that moral worth is developed from experiencing pleasure and pain (Mill, 1863). A utilitarian would support an action that brings the most happiness to the most people. It is necessary to explore and evaluate the ethical cost of deriving stem cells, and in the same way we must also seek to understand the possible benefits of this research. Understanding this cost-benefit dynamic in stem cell research is important, as this is a commonly used form of decision-making.

A utilitarian viewpoint is that moral worth is based on one’s ability to experience pleasure and pain, and encourages a moral compass that directs the user toward actions that cultivate the highest quality pleasure for the most people and reducing suffering. The destruction of the pre-implantation causes no pain to the embryo and is likely to increase quality of life and conscious experience for a number of people as therapies are developed. As neuroscientist and philosopher Sam Harris states in his book Letter to a Christian Nation:

> A three-day-old human embryo is a collection of 150 cells called a blastocyst. There are, for the sake of comparison, more than 100,000 cells in the brain of a fly ... [if] you are concerned about suffering in this universe, killing a fly should present you with greater moral difficulties than killing a human blastocyst.

The “cost” of utilizing embryos for stem cell research is so low that it should not be a concern. Given the possibility of drastically improving human health and well-being using these technologies may be one of the best ways to maximize experience of pleasure and minimize pain. To understand a position a utilitarian might develop regarding stem cell research, we must develop an idea of the possible benefits and concerns of these advancements the advancements.

**Benefits of stem cell research**

Stem cell research is the product of over a hundred years of exploration in the field of developmental biology. The creation of stem cells has allowed for a more detailed understanding of transcription factors and epigenetic changes that allow a stem cell to pass from a pluripotent state to a defined lineage, and has played an important role in research by allowing scientists to culture various tissue types. Stem cells are beneficial because they allow scientists to grow and study various types of tissues in ways not previously possible. For example, stem cells allow researchers to study DNA mutations and disease states, as well as how various tissue types are affected by these conditions, enabling researchers to better understand how living diseased tissues function.

Scientists can also use stem cells to study toxicology and pharmacology by creating tissues, introducing different substances into the cell culture to study how the cells react in previously inaccessible human tissues and
organs, such as the brain. In the future, scientists may utilize patient’s cells to study the way their tissue responds to a given drug to ensure safety and proper dosage, calibrated to the unique genetic information of the individual. Perhaps the biggest goal and potential benefit in stem cell research lies in regenerative medicine. It is the hope of stem cell researchers that one day we may be able to develop the ability to generate organs and tissue for transplant using stem cells. This would allow researchers an enhanced ability to study live organs and reduce the large number of individuals on a waitlist in need of an organ or tissue for transplant.

Concerns with stem cell research

In his work, Stem Cells, Biotechnology, and Human Rights: Implications for a Posthuman Future, Paul Lauritzen raises several concerns regarding the capabilities of stem cell technologies. Assuming that one day, stem cell therapy contributes to the lengthening of human lifespan for an average of about 70 years, to over 110. The consequences of extended human life may include delaying mental maturity, a loss of a value of life, psychological distress, confusion about one’s sense of ‘self’, and a decrease in quality of life. It may also worsen overpopulation and increase the burden of healthcare. A gap between those who have access to and can afford these theoretical life-extending treatments and those that cannot may create societal hierarchy leading to intolerance between groups.

Utilitarian Perspective on stem cell research

One analogy that may be helpful in understanding the utilitarian perspective on stem cell research may be understood by comparing it to fire insurance. Due to the large amount of capital invested in a house, as well our reliance and dependence on the shelter provided by a house, it is worth purchasing fire insurance to protect ourselves from this great possible loss, even though house fires are rare. Homeowners purchase fire insurance to protect them from this risk, and because the cost of fire insurance is relatively low for the security and protection it delivers, it is thought to be a good investment given the relatively low cost and large benefit it grants the owner in the case a fire does occur.

Stem cell research is similar to the fire insurance analogy because the investment in embryos in stem cell research is extremely low relative to the possible benefits to existing peoples. Therefore, it is logical to accept this small burden due to the vastness of possible benefits. In the fire insurance analogy, there are no benefits to the owner outside of the protection and security granted in the event of a fire. Investment in stem cell research is an investment into future discoveries in developmental biology and regenerative medicine, but we begin to see the benefits immediately by using stem cells to test drugs and gather data on the safety and effectiveness of the chemical.

Stem cell research opens the door for major, paradigm-changing discoveries in science and regenerative medicine, while consistently and continuously producing valuable advancements in scientific knowledge. These advances have real implications in improving human health and happiness, and therefore pleasure. The pursuit of these benefits, being so vast, may be worth the utilization of human embryos for research.

Part III: Egg Donor Policy

A vital component in the development of cures is researcher access to a number of human embryonic stem cell lines. Each stem cell line is genetically unique; containing its own genetic variants. In some cases, cell lines possess a genetic disposition to a particular disease or trait, this is one way for researchers to study said disease or trait. Multiple cell lines of a disease states are important to researchers who aim to study that disease because it allows them to understand responses to variations in genetics, and to test whether a given therapy may be applicable across populations. Currently, public policy prohibiting egg donor payment is preventing the addition of new, healthy embryonic stem cell lines for use in research.

Public policy dictates that embryos must be donated and donors cannot receive payment above incurred expenses. With no financial incentive, few individuals are willing to attend multiple appointments and undergo the egg extraction process, thus embryos to create new human embryonic stem cell lines with are scarce. This scarcity, combined with a lack of quality in a number of existing stem cell lines for the number of new stem cell lines produced. This Public policy is preventing stem cell research benefits from being fully realized by restricting the stem cell lines available for use in research. The limited number of healthy stem cell lines, as well as variation in stem cell line quality, is problematic. Failure to classify inequality between stem cell lines makes drawing cross-study comparisons between different stem cell lines difficult (Daley et al., 2009). Furthermore, the National Academies of Science’s Guidelines on human embryonic stem cell research bans egg provider payment (Human Embryonic Stem Cell Research Advisory Committee, 2010). This law makes eggs for research purposes scarce and perpetuates the lack of new and healthy stem cell lines. These restrictions on egg provider compensation in research should be revised to allow payment equal to that available in the clinical setting.

In 2009, President Barack Obama issued an Executive Order that stands as the most recently issued law on stem cell research (Obama, 2009). This federal law prevents eggs obtained from egg provider payment programs from being added to the National Stem Cell Registry. These rules apply to research on hESCs that use National Institute of Health (NIH) funds and the order covers a gamut of concerns including ethical issues, donor consent, the protection of human subjects, and eligibility of hESCs for research using...
NIH funding.

The NIH makes embryonic stem cell lines available for NIH-funded research (NIH Human Embryonic Stem Cell Registry Website, accessed April 2015); however, criteria for the acceptance of new lines dictates that payment cannot be offered for egg donation. There is a shortage of women willing to donate eggs to research under the current conditions. Harvard stem cell researchers Doug Melton and Kevin Eggan spent two years and several thousand dollars before finally securing a donor (Maher, 2008). This shortage of egg donors is creating a huge disparity between eggs that could be utilized in research and the number of eggs available.

That was partially because egg donation is such a laborious process. It requires screenings, consultations, hormone injections, and surgical removal of the eggs. This process requires multiple appointments and can take over a total of 50 hours and donor reimbursement in research tends to be limited to lost wages and child care, while in clinical egg donation donors may receive over $10,000 for the same procedure (Foohey, 2009). The current system offers little incentive for egg donation to stem cell research, making healthy, viable eggs to create new and robust stem cell lines scarce (Klitzman & Sauer, 2009). The ban on funding to egg donors should be removed, and instead the focus of concern should shift to determining what amount of funding is appropriate to pay donors. It seems fair that we seek to set this limit equal to the current market price paid for eggs in clinical use, as the procedures and demands of the process are similar.

Conclusion

This essay has argued for the use of human preimplantation embryos in stem cell research, as human cells best represent human development and are the most powerful tools for learning, discovery, and development of therapeutics available in stem cell research. Exploring ethical issues of using the human preimplantation embryo, the Kantian perspective lacks a perfect duty to use or preserve the embryo. However, the imperfect duty of beneficence supports the use of stem cells to develop and provide advanced patient care. In addition, stem cell research is supported by the general utilitarian view as a viable, appropriate for the advancement of medical research and healthcare given that there is no suffering by the preimplantation embryo.

Stem cell researchers require well characterized, healthy, and viable human stem cell lines (derived from eggs) to produce high quality, reproducible works. We need to consider revising laws that prohibit egg donor compensation and create easier access to eggs for scientists. By allowing for egg donor compensation, researchers will have the materials necessary to create new and robust stem cell lines and enhance stem cell research in the US. This is a necessary step to allow stem cell scientists to produce reliable, high quality research capable of supporting applications in translational medicine.
References


Dario-Becker J. Derived Copy of Biology: Mixed Majors, Part II. OpenStax CNX. Jan 9, 2014 http://cnx.org/contents/a7f544a2-d7d4-4907-9331-3fc521f97b67@2.1.


Karakosta, C. (2015). The difference between a blastocyst transfer and a day 3 transfer. Retrieved February 16, 2016, from https://www.newlife-ivf.co.uk/blog/blastocyst-transfer-vs-day-3-transfer


International Influence on the Displacement of Refugees

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Abstract
This research utilizes the United Nations Database for Refugees in order to establish the three countries that assisted Yugoslavia by taking in the highest number of refugees. Germany, the United States, and Sweden were three countries explored in more detail regarding refugee assistance. This research draws conclusions based on historical context, refugee resettlement policy from the United Nations, and country-specific immigration and refugee policies. Germany, the United States, and Sweden each have a unique connection to Yugoslavia both before and during the Yugoslav Wars. The wars took place from 1991 – 1995 when over half of the Yugoslav population was displaced either outside Yugoslavia or within the Yugoslav borders. Yugoslavia is comprised of modern day Serbia, Bosnia and Herzegovina, Slovenia, Croatia, Macedonia, Montenegro, Kosovo, and the province of Vojvodina. This study describes the history of Yugoslavia as it led to the Yugoslav Wars and the displacement of refugees from Yugoslavia.

Keywords: Yugoslavia, Germany, United States, Sweden, United Nations, refugees, history, policy

Introduction
Former Yugoslavia is an area of interest in this research due to the amount of refugees displaced from the country. Former Yugoslavia encompassed seven states within the larger country. Yugoslavia was formed after World War I because of the state deciding to become a separate entity. It was initially formed as the Kingdom of Serbs, Croats and Slovenes but was later renamed Kingdom of Yugoslavia. The Kingdom of Yugoslavia came together as one large state but then divided into separate provinces while banning communism. Before World War II Croatia attempted to break away from Yugoslavia and become an independent state but was stopped when Adolf Hitler attacked Yugoslavia.

Throughout World War II, there were conflicts between the communist-led Yugoslav Partisans and pro-Serbian Chetniks. The Partisans were led by Josip Broz Tito, who would later become the president of Yugoslavia.

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