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Ethics Surrounding Human Embryonic Stem Cell Research

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Abstract: Since their unearthing in the mid 1990's, Stem Cells have carried with them the promise of developmental, significant scientific and medicinal research. Likewise, it has the prospect that possessed the possibility of enhancing treatments for a host of diseases. These 'super cells' have a key clinical prospect in tissue repair, with its adherers believing that they symbolizes the future relief or cure of varieties of common disabilities; substitute of faulty cells in a patient through transplantation of hES cell-derived equivalent which could help restore normal function. Those who seek to curtail the use of certain stem cell lines, revert to the argument that has defined many medical centric debates over the previous decades. The argument, the destruction of human life to create life, is the stalwart philosophical point that all anti-stem cell advocates attempt to make. The purpose of this discussion is to engage in an analysis of the various aspects of the ethical debate relating to the use of stem cells in medical research.

Keywords: Ethics, Stem Cells, Medical Research, Human Embryo.

INTRODUCTION

Stem Cells have been at the focal point of the scientific research worldview in terms of creating inventive treatments that could change the momentum course of therapeutic care [1]. With the appearance of therapeutic and scientific research comes the inescapable rise of the controversy that has appeared with each major scientific and medical development. The use of Stem Cells is the same.

The argument, the destruction of human life to create life, is the stalwart philosophical point that all anti-stem cell advocates attempt to make. These individuals liken the use of stem cells as akin to murder, the same vantage point that the anti-abortion interest groups use to persuade others - liken the process to that of killing of innocent human life [2]. Those who seek to curtail the use of certain stem cell lines, revert to the argument that has defined many medical centric debates over the previous decades. Conversely, those who purport the use of stem cells often find themselves in concrete scientific evidence that demonstrates how potent stem cells are in terms of treating previously untreatable diseases. Humans, for the most part, seek to minimize pain and maximize pleasure. This dichotomy can be expressed in medical terms as well. Individuals are willing to involve themselves in various treatments that can prolong their lives or possibly reverse their condition. To this end, public opinion generally comes down in support of stem cell research. The purpose of this discussion is to engage in an analysis of the various aspects of the ethical debate relating to the use of stem cells in medical research.

HUMAN EMBRYONIC STEM CELL

Stem cells are akin to "blank slates" in terms of their genetic growth and principles. Stem cells possess two unique qualities that separate them from other cells in the human body [3] First, Stem Cells has the capacity to develop into whichever cell type in the body. A stem cell can be produced in the red bone marrow and then be placed into a pietri dish with cardiac cells [4]. Eventually, the stem cell will adapt the properties of those surrounding cardiac cells and develop into another cardiac cell-taking with it all the qualities and characteristics of the cardiac cell they are introduced to. This differentiation principle allows stem cells to repair damaged tissues and organ systems [5]. There have been many studies that demonstrate infusion of stem cells into damaged muscle tissue following trauma, can increase the likelihood of a patient having a positive recovery, minimizing damage to internal organs or tissues. This principle is highly valuable to scientists seeking to harness this differentiation principle to direct stem cells in their quest to cure certain diseases [5]. There are two distinct types of stem cells that researchers have used; Embryonic and Adult. The more potent stem cell lines that are used in medical research are derived from frozen human embryos, these Human Embryonic Stem Cells possess the greatest capacity to develop and foster immense possibilities in dealing with diseases. These stem cells are derived from those embryos that have been frozen and are waiting for fertilization from a male gamete. However,

there are some instances in which these embryonic stem cells are not fertilized; therefore they are set to be discarded. Rather than have these embryos destroyed, they are used for scientific research to harvest their DNA and used in clinical treatments or academic research to investigate the impact of certain proposed treatments. In recent years, scientists have been able to identify highly specialized conditions that allow a cell to be "reprogrammed" and revert back to its stem cell state; allowing it to exhibit the main principles of a stem cell-differentiation and tissue repair. These cells are referred to as "Induced Pluripotent Stem Cells" or (IPSC's) [5]. All three classes of stem cells: embryonic, adult and IPSC all posses the potential to radically alter the course of modern medicine and unlock the full impact of cell-based regenerative therapies to treat diseases such as diabetes, myocardial infarctions along with Alzheimer's and Parkinson's. Despite the inherent similarities between these various cell lines, there are differences that must be addressed.

The first difference is that each cell line inherently contains various levels of differentiation abilities. For example, Human Embryonic Stem Cells (hESC's) posses the highest level of differentiated ability in that they can be programmed to form any type of cell in the human body. Adult stem cells exhibit a more limited capacity for differentiation. Adult stem cells are restricted to distinguishing into additional cells from their tissue of origin. Specifically, an adult stem cell from a calf muscle cannot be introduced into the spinal column in order to regenerate damaged nerve tissue. Another critical difference between the two cell lines involves their generation.

Embryonic stem cells are more readily produced in culture. Adult stem cells, in contrast, are rarely found in mature tissue; therefore the process of isolating these cells is increasingly difficult. A related distinction is the ability of tissues derived from these cell lines to be rejected after transplantation. Currently, there is little data involving the tissues derived from Human Embryonic Stem Cells given the Food and Drug Administration has only recently given approval to allow human testing in Phase-1 clinical trials that involve transplanting tissues generated from Human Embryonic Stem Cells. Conversely, there is ample data to suggest that those tissues created from Adult stem cells are less likely to be rejected during transplantation. The science behind this principle is relatively straightforward; the patient's own cells are utilized in creating this newly formed tissue, therefore the incidents rates and probability of the patient's own T-Cells and B-Cells creating a histological reaction to "self" is increasingly unlikely.

IPSC's or "Induced Pluripotent Stem Cells" are the latest stem cells to be developed by research scientists. As defined earlier, these stem cells are not an individual stem cell line, like Embryonic or Adult, are more akin to a "sub-division". These are cells that have been genetically reprogrammed through a variety of recombinant DNA and RNA technologies that have allowed these cells to revert to their stem cell phase, hence the word "Induced"- these cells are "induced" into becoming stem cells. Two types of IPSC's were developed, mice [6] and humans [7]. Each of these cell lines exhibited qualities important to the foundation of pluripotent stem cells. Bot mouse and human IPSC's were able to form tumor necrosing cells, exhibit numerous cell markers and differentiate into a variety of tissues once injected into mice. Despite the fact that these stem cells are just a couple of years old, they possess boundless potential in terms of clinical research. Specifically, scientists are focusing their potential uses in transplant medicine keeping in mind the end goal to significantly diminish the level of the two infections and general organ dismissal in organ transplant surgery. The potential for using stem cells is of vast clinical and medicinal significance. These cells could possibly enable scientists to realize what occurs at the cell and molecular levels of human improvement and use this information to distinguish certain molecular pathways that add to an assortment of conditions. Moreover, using these stem cells could also enable scientists to discover the genes that are activated in response to certain cell conditions that cause quick, unchecked cell development or sporadic cell patterns. Moreover, using stem cells to discover certain genetic conditions will loan immense measure of information to the scientists and bear the cost of researchers the chance to improve their understanding of various disorders caused by genetics.

ISSUES RAISED ABOUT STEM CELLS

Regardless of this developing potential there are impediments related with the usage of these cell lines in the quest for medical advancement. The utilization of stem cells comes appended with an assortment of moral, legal, ethical and philosophical issues. The rest of this paper will center on these issues. The individuals who attest that killing human developing embryos is ethically inexcusable usually assert the proverb that all people were once embryos, meriting all the regard that other people are acclimated with. This contention mixes the moral, religious and philosophical components of the idea of the initiation of human life. This saying has two principle branches:

- The embryo is the initial phase of development in the existence of a human being and
- Human beings have the similar moral status at all stages of growth and development, as well as the embryonic phase [8]. These two branches are inalienably philosophical in nature in that it forecasts to make difference in regards to human nature. These sayings appear to be inconsistent with the ethical reasons used to legitimize treating people in varying manners subject to their nature. If

an individual was before an embryo it would logically stream that that person's nature was different. Hence, it would passable to treat you in a way that would be wrong as this individual became older. It may seem impossible to expect that radical changes in a person's nature can never influence that person's ethical status. The real antithesis to the religiosity of the counter stem cell investigate contention is to place the inquiry "Are six-day old embryos human organisms?"[4]. Albeit current science has not elucidated or loaned any help with deciding whether a six day embryos is an individual, there is surely space to make reasonable doubt. There are two contending dispositions in regards to what happens once conception happens. The primary builds accept that consequent cell division is however the initial phases in the life expectancy of a single individual having differentiating characteristics that will make up their fundamental self and enable the person to shape into a rational being. The second build does not treat the blend of the female and male gamete as a human life form [9]. As for the first premise, despite the fact that truly every one of the cells are in a single unit-they are held together by a singly cellular membrane it is hard to figure out what makes all these different cells parts of a individual. This logical premise leads yet to another inquiry, or necessity, keeping in mind the end goal to figure out what makes these cells a single human individual, there must be the assurance about what, precisely, a human organism is- a “first principles” way to deal with this inquiry. Human organisms are elements with human genes that make living organs that function mutually in harmonious concert; however these organs all by themselves don't constitute living beings [10].

The second construct regarding what occurs after the combination of male and female gametes holds that this combination and the inevitable allocation of cells does not constitute a human organism. According to this philosophical premise, once this single cell begins to divide, only the constituent make components of the cells remain [11]. When the first cell divides, it ceases to exist, although its offspring is two daughter cells. Likewise, when these cells divide they cease to exist leaving in its wake the offspring cells. The second construct with respect to what happens after the mix of male and female gametes holds that this mix and the unavoidable allocation of cells does not constitute a human organism. As indicated by this philosophical premise, once this single cell starts to partition, just the constituent makes segments of the cells to remain [11]. At the point when the first cell partitions, it stops to exist, in spite of the fact that its posterity is two daughter cells. In like manner, when these cells partition they stop to exist leaving in its wake the offspring cells. In this manner there isn't a single individual remaining all through the change. Just when there is a considerable separation in cellular function, position and structure that the claim about incorporating parts of an organismic structure being available. Deductively, this kind of distinctive presentation is absent until the point when about two weeks after fertilization it appears to be logical this is where individuals are said to exist. Those individuals who opine that the principal levels of embryonic development constitute a legitimate human life, deserving of the largest amounts of protection bear a predictable objection that prompt yet another philosophical inquiry, that must be tended to while considering the moral issues that would need to be set out to permit embryonic stem cell research [12]. The issue of cell specialization seems, by all accounts, significant component of individuals who believe that embryo represents human life. In any case, the inquiry that must be addressed is, at the time these people assert an embryo speaks to a human life; does the embryo at this moment symbolize a higher order of life? This inquiry wanders from the absolutely biological to the metaphysical [13].

In the event that the tiny level of cellular interaction is to be resolved as the start of human life, then brain death ought not be viewed as both the moral, legal and biological standard of when a man stop to live. Brain death is a good example with the fundamental premise of cell-based interaction between neural cells and different tissues and cells inside the human body [14]. Nonetheless, present day science has characterized this state as a state wherein people have stopped to live-in a more philosophical sense they have lost all fundamental self characteristics and have basically turned into an amalgamation of various cells, organ system and tissues -in all cases; those people in this situation are managed by artificial way, i.e. life support. Indeed, even the most impassioned defender of the rights of an embryo would be unable to characterize an individual having an indistinguishable level of cellular interactions and operations as that of a six day embryo life as a feasible, living person [15].

The contentions underlying the requirement for human embryonic stem cell research includes different philosophical and metaphysical standards to set up the believe that embryos are not people in light of the logical premise that despite the fact that the embryo is an accumulation of cells working in concert at a level higher than they would display in singularity; their deliberate exertion does not fit characterize an embryo as a “higher order of life”-- a human being, along these lines this prompts the legitimate conclusion that if the embryo isn't a person by not being a “higher order of life” at that point the embryo isn't meriting any extra protection or the rights given to traditional human creatures [16].

The contentions against embryonic stem cell research are profoundly established in moral, ethical and religious grounds and speculations. All shaping a larger construct that will serve to support the theory that embryos represent to the most guiltless of human life and should have been managed the maximum measure of protection under the law.

The contentions against embryonic stem cell research start from the suggestion that the embryo is without a doubt the most complex substance known to man. The contention recognizes that the embryo does not look like the scarcest piece the makings of a human being, in the conventional sense. In any case, the way that every human being begin as embryos brings into setting the gravity of every single individuals origins and the need to esteem those inceptions as consecrated human life. The embryo commands a specific level of regard and it is basic that this regard is kept up.

The principal philosophical tenant of this contention is the fertilization of a female gamete by a male gamete speaks to the union of a woman and a man to encourage the development of a human life [17]. In this manner, the embryo is a human life in its most fundamental of structures. As per this domain the embryo isn't only an accumulation of cells but instead a strong unit cooperating in show to play out those essential capacities that render human life in presence [18]. This contention looks to remedy the position taken by the individuals who contend for stem cell research with respect to the recognizing characteristics between a developed human being and a gesture stage embryo [7]. Likewise, an individual is an individual paying little respect to the phases of development.

All human being are afforded the essential protections of their morality and dignity regardless of their phase of development or level of distinguishing characteristics. The more serious aspects of this logical construct deals with individuality, potentiality and "special respect". Those who seek to impart a moral supremacy to the embryo counter the "14" day mark by asserting that the innate genetic conditions that essentially describe what it means to be a human being are present at the first moment of conception [19]. Therefore, nothing happens after that bestows upon the embryo the degree of "humanness" necessary to trigger the moral protection of a human embryo. In deed those taking this line of reasoning find agreement in the ancient text of Aristotle that discusses the "handedness" of a thing, in that the essential qualities are present even if a thing lacks traditional structures and qualities.

The morality and ethical constructs that are present within the logical premises that form the underlying foundation of the arguments against stem cell research inevitably circle back to the concept that the aura surrounding the embryo is one of intense mystery [20]. The mere existence of the embryo demonstrates the very essence of human history-given that all individuals started out as a fertilized egg.; adding the rubric of preserving this state of being through enhanced moral and ethical protections renders their use in scientific research nearly impossible [21].This maxim flows into the overtly religious aspect of the argument, the aspect of protecting the weakest among you; similar to Jesus' words "When you did so for the least amongst you, you have done so for me".

This religious connotation is firmly demonstrated in the arguments used by those individuals and groups seeking to curtail stem cell research. The very existence of the human embryo and its use in scientific research, according to this group, goes to the very heart of what it means to treat all individuals with the same level of equality-although one could very easily argue that the turbulent history of the United States has certainly contained some contradictory events to this very fundamental precept. For those seeking to limit the use of embryonic stem cells in laboratories, the matter boils down to two simple absolutes: the embryo is the weakest form of humanity and society must maintain consistency with its moral justifications to ensure that all individuals regardless of background or stage of development are entitled to equal protections under the law and morality [6]. These truths lead to an examination of the societal aspects of this argument.

Those who argue the moral and religious connotations in relation to embryonic stem cell research hold that this form of scientific inquiry represents the crossing of several moral and ethical boundaries. Using embryonic stem cells for the sole purpose of their destruction creates a sort of instrumentality of human life [22]. This argument makes the distinction that those embryos that were set for destruction did not lose their moral authority if those embryos were used for medical research [23]. However, the moral justification for limiting stem cell research calls out those cells that are "programmed" to revert to their stem cell state and are in turn used for the sole purpose of being destroyed[24]. These "re-programmed" cells referred to as IPSC's lose all moral equivalencies and therefore should not be generated for the singular purpose of destruction.

When this logical paradigm is viewed through the perspective of the fate of the embryo itself, the distinction-morally speaking-between an embryo destined for destruction and creating a stem cell through inducement may be insignificant [5]. However, when viewing this tension through the lens of how it affects the very moral fabric of our society the issue becomes more complex. Those who portend the embryo is a representation of the earliest forms of humanity contend that once using embryos for the singular purpose of genetic and medical research begins it will be

increasingly difficult to arrive at a natural stopping point [25]. This, according to this logic, would lead to the very real possibility of further moral hazards being encountered, excused and accepted. The logical ending of this contention is that a society that readily excuses the destruction of unborn fetus' within the second and third trimester will not be morally outraged by the deliberate use of an embryo for clinical research into genetic conditions that spur the onset of a particular disease [26].

At their core, those arguing the moral relativism against stem cell research find themselves asserting the doctrine of "personhood and the right to life". This was a maxim first expressed in the Supreme Court's pronouncement in the milestone case Roe v. Wade. In this opinion, the court did concede some ground to those in the moral camp by asserting that the embryo did on some level represent a degree of humanity with the inherent characteristics and qualities other humans have and enjoy. The court even references the concept of "potential people" and states that there is something not just imprudent but also immoral about the willful and wanton destruction of "potential people"; however, the court went on to say that this right does not trump the woman's right to terminate the pregnancy. This bellies the point that the US Supreme Court on some level did acknowledge that "potential people" do exist and are deserving of certain rights. Therefore those that claim that stem cell research is predicated on a disregard for the basic of all human rights, the right to life fined comfort in a legal opinion, that at its logical conclusion, opted for the right of the human over the "potential person".

Within the ideological construct of opposing stem cell research because it would destroy life there is a growing subset of those who feel it is appropriate to conduct research on aborted fetuses. The underlying logic of this premise is that an aborted fetus is already dead and that if modern science and engage in nuclear transfusion to clone embryos then they would be capable of utilizing an already deceased fetus to engage in stem cell research.

In the event that the extension of ruinous research on IVF embryos and the start of cloning for research are permitted to proceed, this will create further moral issues concerning the issue of complicity in these exercises [27]. It is ethically wrong to destroy human beings, as well as to commission or approve their destruction. Cloning and stem cell research make difficult issues of conscience, patients, doctors, researchers and those requested to donate material to create embryos for research [28]. For instance, a patient who supplies a cell to create a clone would expect the destruction of the clone for reaping its cells. Complicity issues are not restricted to situations where one *intends* the bad behavior of others. Indeed, even the individuals who don't mean a demonstration of injustice can act wrongly them by giving the impression they excuse it, if what they do is firmly connected to such an act [29]. Consequently a patient may act wrongly in the event that he or she accepted a stem cell treatment - even one which did not itself obliterate embryos - if that treatment had been produced by methods for the obliteration of embryos. If the best treatment advanced for a serious medical situation is one which includes, or has involved, the advent and destruction of embryos, this could condemn conscientious physicians and patients to endure a merciless trial. Except they act towards their conscience - patients will endure without expectation of treatment and likewise doctors will be powerless to offer any substitute [30]. This circumstance would be unbearable. Embryonic stem cellular research is morally complicated due to the fact an evil approach is used to secure a good cease. In essence, accepting embryonic stem cells received through elective abortion makes one an associate to a criminal offense after the fact. In contrast to adult organ donations, the demise of the embryo is intentionally precipitated. This is barely similar to when organs are recovered from a person killed in a sad coincidence [31]. Consider the case of a hospital that is a beneficiary of a gang of killers who supply it with fresh cadavers. Definitely one may want to question the ethical appropriateness of the medical institution's persevering with cooperation with the providers (gang of killers).

CONCLUSION

Stem cell research has been at the forefront of biotechnological advances because of the impending curative uses of the cells. Research into stem cells and how they divide can help provide answers about how cells divide and, it is hoped, ultimately teach researchers how improper cell division occurs in cancer and birth defects. Once the scientists learn the process of cell division in these, the hope is that they can then develop cures. Research into stem cells can lead to improvements in the efficiency of drugs for treatment of a variety of illness. In addition, many researchers believe that stem cell research can help them develop cures for diabetes, cardiovascular and other diseases by helping scientists develop processes for creating new body organs or repairing existing body organs that have become diseased. Stem cells are cells that encompass the capability to divide indefinitely and to separate into any type of cell, including organ, skin or any other type of cell. Stem cells are created as part of the fertilized egg or zygote that is created in the first few days after an egg is fertilized. As the zygote divides into more cells, it becomes an embryo. Human stem cells are generally isolated from either the embryo (known as embryonic stem cells) or from fetal tissue (known as embryonic germ cells).

The "human" status of an embryo, if any, is complicated and arguably non-existent under the law.

Zygotes are the first combination of cells that grow into the embryo, shortly after fertilization. An embryo develops after the initial fertilization and from the zygotes. At the point of fertilization, the zygote (and thus the embryo) has the potential to become a "born" human being. It possesses all the chromosomes necessary to become a distinct, unique human being, although it is not sentient. Embryonic stem cells grow after the initial fertilization and before the embryonic cells differentiate into brain cells, tissue cells, and other specific cells of the body. As noted above, the law treats the stem cells as property (as noted above) that can be patented. Zygotes are also treated as property; the next question is the law's treatment of embryos: are they persons or property?

The ethical issues are as thorny and complicated as the legal issues. There is also no final arbiter to determine how the moral issue should be resolved. The legal analysis at least demonstrated the courts' stance on the human rights of embryos. From a moral perspective, if the stem cells are merely cells, i.e. property, and the stem cells are not persons, then the ethical issue is different than if the stem cells, zygotes and/or embryos are persons. A brief summary of key ethical theories follows:

Immanuel Kant's key moral principle is the concept of a good will. The good will exists beyond intelligence, power, wealth, and happiness. Although intelligence, power, wealth, and happiness can be evidence of a good will, these qualities are not intrinsically good will because they can be perverted [24]. It is the good "character" which helps to determine whether someone's actions are moral or not. Duty is the objective manifestation of good will and an action is moral if it is done because of this duty, regardless of consequences. The ultimate good in Kant's eyes is the individual's decision to act consistently with the principles that help to obtain the ultimate goal, a good will, which is valuable in and of it. An important maxim for Kant's philosophy is the categorical imperative: "Act so that you treat humanity, whether in your own person or in that of another, always as an end and never as a means only."

How does Kant's analysis apply here? The key would be to determine whether there were any duties to stem cells, zygotes or embryos. One could argue, although Kant seemed to support scientific inquiry, that whether stem cell research was valid depended on whether zygotes would be treated as human. Since they are parts of nature, perhaps one could argue that application of a Kantian analysis results in a prohibition against treatment of zygotes as a means to an end, rather than as human beings. This would be independent of a determination of whether the zygotes or embryos were human or not. One could also use Kant's analysis to support a position that the duties would be to those who are currently existing, e.g. that the duty to permit individuals to procreate (or not) is a higher duty.

Utilitarian philosophy requires analyzing an action or a principle to determine whether that action maximizes the good for society. Jeremy Bentham and his student, John Stuart Mill, defined the principle of utility as relating to the issue of maximizing the pleasure or good for the individual and thus for society. The principle of utility focuses on determining whether an action is moral or right based on the consequences.

As Bentham explained, "By utility is meant that property in any object, whereby it tends to produce benefits, advantage, pleasure, good or happiness. . . or. . . to prevent the happening of mischief, pain, evil or unhappiness to the party whose interest is considered: if that party be the community in general, then the happiness of the community; if a particular individual, then the happiness of that individual". Under this philosophy, actions or concepts that will bring pleasure may be instrumentally good, i.e. because they help to accomplish the ultimate good-pleasure. There are no true intrinsic goods except the maximum of happiness.

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