Editorial

A brief review of the ethics of stem cell research

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Abstract

Stem cell research is a still a controversial area of the research and different countries have different levels of acceptance to the different domains of this area. Reason being the different ethical values depending on the culture and religions of the different countries. In this paper different ethical values and practices in stem cell research are being discussed as this a practice which holds the future for managing many diseases.

Keywords: Stem cell research; ethics; oocyte donation; stem cell therapy.

Introduction

Stem cell therapy is giving injections of stem cells. Stem cells are providing relief to many diseases which are not curable or chronic requiring medicines for the rest of life. It is also being used in trauma cases where otherwise lengthy surgeries are needed and which is being replaced by stem cell therapies. Stem cells may be obtained from a blastocyst (embryonic stem cell) or from some selective adult tissue (Adult stem cells) (1). Stem cell research is necessary to know how to control stem cells differentiation, study drug screening, modeling diseases and therapies based on stem cells (2).

Embryonic stem cell research though can cure many diseases and looks very promising yet it has a lot of opposition because this embryo has to be destroyed. Embryonic stem cells are taken from the inner cell mass of the blastocyst (3).

Embryonic stem cell research has more ethical issues than the adult stem cell research as different religions have different views on the different entities of the embryonic stem cell research. Catholics are more restrictive (4) as the sacredness of human life is considered by Malaysian Catholics (5) and so are the Hindus and Buddhists as it involves sanctity of human life but Malaysian Hindus and Buddhists allow research with reservation though it is harming of a life yet the intentions are good (5). Judaism and Islam do not believe that life starts with embryo and Jews also do not believe that that start of the life is embryo (6).
In Germany, there is restrictive regulation on the embryo research and is due to its Nazi past and Catholic religion and have in place the Acts like “Stem Cell Act” and “Regulation of Preimplantation Genetic Diagnosis” (4).

In UK Mitochondrial Replacement Techniques are allowed under “HFE Regulations 2015” and the objections of possible harm to egg donors, affect the studies of genealogical ancestry and transmission of nuclear DNA only against it does not seem legal (7).

Though Induced Pluripotent Stem cell research is a great potential yet it also has the ethical problem of a somatic cell being used in a manner where it develops a Pluripotency (8).

Embryonic stem cells for research are usually taken from the leftover embryonic stem cells of the clinics helping infertility procedures (9)(10). Oocyte donation is a well-accepted procedure for the infertile couples in the USA and is a big industry but it is involved in many ethical and legal issues. Authors have identified four distinct areas of donation of the oocytes and how to select these donors, how to screen them, to retrieve the
oocytes and then how to monitor these donors (11).

In this procedure, there are compensation issues in addition to medical and psychological issues in the procedure of IVF involving stimulation, egg retrieval, insemination and fertilization, embryo culture and embryo transfer (12). As stimulation of the ladies to get the oocytes may result in Ovarian Hyper Stimulation Syndrome which can result in medical complications and there are chances that in future these women may become infertile and ultimately with dangers of ovarian cancer. If it is allowed fully informed consent should be taken and if we do not allow it there we are denying the right of self-determination and we are not respecting the autonomy of the person. (12).

Testicular tissue cryopreservation is another area where tissues can be used for further reproduction in patients who take chemotherapy and their fertility may be affected due to anticancer treatment at a young age. But this method also has ethical issues which are poorly studied so far (13).

Regenerative medicine though seems to be very useful but again it has the challenging issues of selecting the persons for the clinical trials due to difficulties in obtaining informed consent as the future benefits may be uncertain and balancing the benefit-harm and selection of the size of the sample in such cases but it is ok if there is low risk and degenerative manifestation can be related to the disease (14).

Stem cell treatment has even found a curefor HIV infected patient. It is important to note that cure word is important psychologically though in the clinical context remission may be more appropriate (15).

In research, data may be duplicated usually partially and this is a big ethical issue. The data is fabricated more at the undergraduate level (16). If commercialization of University research is done it has its own ethical issues and usually, it is commercialized before it is fully researched and it affects the environment of the research and may harm the long run to the research in the universities (17). Research on the stem cells is also going to be affected by the economic interests (10).

Compromises may be done in stem cell research as people are divided into groups supporting or opposing the idea of research on this controversial topics but taking stand can sometimes corrupt the ideas and lower the standards (18).

Mitochondrial replacement technique or three parents 'In Vitro Fertilization' in which mitochondrial DNA of from donor egg and DNA of mother and father are used to produce a child to take care of the mitochondrial-related diseases. In this child will be free the mitochondrial-related disease in the mother. In the UK this is permitted by law though it is not permitted in the USA. Designer babies are considered risk especially to the future generations. And with the risk to the exploitation of the egg donors and the ethics of privacy of the donor along with the objection of killing the embryos after experimenting on them (19).

Proponents of this stem cell research that it has a great potential to cure many diseases like Parkinson's disease, degenerative and debilitating diseases, diabetes (9) and Alzheimer's disease (1).

Opponents put forth the view that in this blastocyst which can develop into a human being has to be destroyed equals to destroying one human life (9)(4).

Material and methods

Web of Science was used to retrieve the articles for this research. 12 papers were selected after reading their abstracts and findings from these papers are being presented. To cover the gaps, google search was used and google scholar was used to retrieving the full papers and get some additional papers.

Discussion

Stem cell therapy offers to vide coverage to diseases from trauma, degenerative diseases and diseases related to genes. Stem cell research involves Embryonic stem cell research and Adult stem cell research. Adult stem cell therapy and research are less objectionable as compared to embryonic stem cell research due to the moral status of the embryos as these cells have all the potential to develop into a full human being and life are considered to start with the formation of the zygote.

The greatest challenge to the stem cell research is the practice of violation of pledge taken not to kill the human being right from its inception. It may seem that enhancement of the features of human beings is like playing with nature and if it is not guided by ethical values it may become an uncontrolled double-edged weapon.

Adult stem cells are not ready to isolate whereas embryonic stem cells are available in plenty and that makes it a favorite area of research.

As the practice of oocyte donation is increasing and there may arise conflicts of interest between donors, professionals and the recipients so there is need to reduce the conflicts so the research on this issue becomes

more imperative. Mediation and prohibition have been suggested as a means to resolve this conflict but the best way is to self-regulate the profession (11).

Problems will be less if use organismically dead embryos. Somatic cell nuclear transfer [SCNT] technology though produce embryo in the labs yet again there is the destruction of an embryo in this procedure and may have the same ethical problems for the egg donors. In interspecies SCNT problems are less as there are no donors so the question of exploitation is absent. Induced pluripotent stem cells can be the source of the stem cell with less ethical issues.

We should be able to identify the ethical issues in the research of stem cells and should try to address them before we start the research.

Conclusion

Problems of adult stem cell can be taken care of by well-informed consent of the donor. Research on stem cell research has many proponents and many opponents and each group offering valid logic. But in the science, it has always been seen that whenever a revolutionary idea and practices start there is always a strong opposition due to religious and cultural values of different groups but as more and more therapeutic values get established opponents go on becoming weak. This is true with the stem cell research and this is going to stay and develop and has a vast scope of providing benefits to the humanity.

Conflict of Interest

None

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Editor-in-Chief

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