

MEDICAL ETHICS IN GENE THERAPY

Sehrish Naz

Submitted: March 16, 2017

Accepted: May 23, 2017

Author Information

From: Institute of Nursing Sciences, Khyber Medical University, Peshawar, Khyber Pakhtunkhwa, Pakistan.

Ms Sehrish Naz (RN, MSN)

(Corresponding Author)

Email: snaz0185@gmail.com

ABSTRACT

The spectacular revolutions of the twenty first century in genetic and information technologies brought caused fundamental paradigm shifts in human thinking, communication, work, and play. Scientists are now able to convert, operate, and produce living organisms for most purposes. From medicine to agriculture and many other fields, manipulation of entire organisms, their genetic codes, and their natural environments can be manipulated. While such biotechnology is very beneficial for uses in medicine, crop production, and other areas, a number of ethical issues have arisen and more are likely to arise. It is important to harness these technologies in light of modern ethical principles to prevent misuse and unintended or intended harm. This paper highlights the principles of human ethics as well as raises questions that could be relevant to the future direction of further advances in biotechnology, in particular gene therapy.

Keywords: Ethics, Medical; Genetic Therapy; Genetic Engineering; Biotechnology.

Citation: Naz S. Medical ethics in gene therapy (General Article). J Rehman Med Inst. 2017;3(1-2):59-62.

INTRODUCTION

The twenty-first century, known as the DNA and silicon age, brought about spectacular revolutions in human thought, communication, work, and play. Modernization and convergence of various technologies helped to produce current genetic innovations. Human beings are near to being able to convert, operate, and produce living organisms for most purposes. From medicine to crop growing and from production to even calculating, people are near to manipulating the entire organism, genetic codes and the natural world. Genetic engineering and biotechnology are very beneficial sources, with uses in medicine, crop production, and in other modern directions. Society has started obtaining rewards of genetic engineering in the form of drug therapies and increased crop production with less harm as a result. It has possibility to improve our health and impact positively on living; it helps to utilize some degree of resources and produces more assets. Beyond all these benefits, one should also keep in mind the ethical principles that are autonomy, beneficence, non-maleficence, and justice, because its potential benefits are more important than its harms. There is no absolute cause to reject it and call it unnatural. It should be

understood as an established and sophisticated genetic technology and revolution. On the contrary, ground-breaking technology, fears, and ethical arguments with genetic engineering abound. Some says that the said technology is beneficial but suggests precautions, while others say that these are misinformation and unfair from the religious point of view. To help decide the dilemma, this paper will focus its attention on answering some of the questions, like should gene therapy be allowed ethically. If it is ethically allowed, then who will be affected by it and under what circumstances, should it be allowed? Does religion permit gene therapy? Looking at the argument of the gene therapy I will sum up the answer to all these questions in the conclusion.

An ethical point of view in gene therapy

It has already been discussed that genetic engineering supplies crop production and other practical benefits to human beings and environment, e.g. Ananda Chakrabarty, who did genetic mutation into a bacterium named *Burkholderia cepacia* (a variant that digests petroleum products). He took a copyright for his new life form, and assisted in establishing the Supreme Court precedent that enables inventors

to copyright genetically innovated life forms. (1). The bacterium un-contaminates oil spills and has been confirmed to be harmless and helpful. The Onco Mouse (U.S. Patent #75797027) was the first genetically mutated mouse to be copyrighted and used as a representative for cancer research.

Researchers used to (and still do) sacrifice animals for genetic research and made medicine and other beneficial therapies for human beings. Gene therapy, in which synthetic viruses can bring preserved in somatic cells with genetic imperfection, is manufacturing pace to treat genetic malady or insufficiency in adults. The guarantee of new genetic technologies includes the development of pest-resistant damage of crops that will require no pesticides, or healthy drought-resistant vegetation that can be cultivated in harsh atmosphere without irrigation.² This therapy offers more production of animal milk, and may be more resistant to infections and dropping the need for harmful antibiotics.³

Communitarianism

Communitarianism (the concept of self-governing communities) also supports gene therapy, because it places the community, the state, the nation or any other entity, at the center of the value system. It emphasizes the value of public goods.⁴

Utilitarianism

Utilitarianism focuses on “consequences of action, on the greater amount of happiness or the least harm for the greater number of people;⁵ according to this theory there are very rare negative effects and much benefits of the gene therapy.

Kantianism

Deontology or Kantianism (ethical theory based on duty) may also be violated because it gives benefits but harms as well and the Kantian theory

says that it should be fruitful from all aspects, otherwise it will diminish individual’s dignity and will threaten humanity. One of the major drawbacks of this process is its complication.

Autonomy

The first ethical principle that is called autonomy is highly compatible with gene therapy. Recognition of human self-esteem often denotes taking steps to make sure that wherever natural world slows down human potential, every individual potential possibly will be attained to the fullest. The disabled and the infirm should be aided wherever possible, and consistent with their stated goals, to achieve their potential, consistent with the principle of avoiding harm to others. In fact, identifying the innate dignity of the humans recommends that one is encouraged to practice genetic research, to the amount that it can assist to expand therapies for those who undergo or expand usual or unintentional demerits.⁶ Nor do improvements cause an innate risk to individual dignity. Self-perfection is more often than not praised, not hated.

Beneficence

The second ethical principle that is also compatible, to do good to people, like the treatment of infertility and many other benefits that have been explained before. Undoubtedly, few demerits of genetic therapy also possibly will require modification to suit individual dignity. Actions that reduce the capabilities of others cause offense to individual dignity. Dependence is the most tremendous example, but less extreme reductions to individual dignity abound.

Non-Maleficence

Gene therapy focuses on treating humans by targeting their bones and blood cells. This therapy did not pass to procreation of the person. However, when the therapy targets egg and sperms it allows the insertion of genes to procreation and that is called germline gene

therapy. This idea is also controversial because it spares future generations and causes genetic disorders to developing fetus in unexpected ways and long lasting adverse effects are still unknown. Due to ethical concerns of this therapy, the U.S. government does not allow federal funds for gene therapy research on people. All this process requires caution.⁷ According to the above discussion, the third ethical principle (means to do good with humanity) has been violated there. To diminish human capabilities e.g. human cognition is unethical, and to make them slaves by reducing their mental capacities will violate autonomy as well as Non-Maleficence (principle of ethics).

Justice and Equity

The fourth ethical principle may also be violated; great disparities may occur due to wealth and power. Gene therapy is considered as advanced biotechnology and is a very expensive treatment. Though poor people desire it but cannot afford such therapy. It is observed that existing disparities as well as new ones are taking place due to genetic innovations, especially genetic improvement,⁸ e.g. cosmetics enhancements are the risk to create a class division between rich and poor. Despite everything, cosmetic surgeries grant substantial financial and societal profit to those who are able to pay for it.⁹

In addition, parents may want to make their child a good athlete. This needs stamina, tall height, good health and attractive looks, brought about by genetic treatment to their procreation. Such a genetically improved person may enjoy vast benefits of society as compared to non-modified persons. This unjust competition will lead poor people towards potential insecurity and disparity.¹⁰ Above mentioned and many other scenarios can be predicted for the series of capabilities; such as intelligence, music and art, physical features, pleasant appearance, etc.

CONCLUSION

Gene therapy is strong and beneficial enough to modernize our lives in several optimistic behaviors. To reject this modern technology as immoral and biased seems to be grounded in religious prejudices and instinctive negative reactions. This technology provides an additional room for previously accepted and entrenched methods intended for propagation of species, but provides diverse benefits of customized manufacture and quicker outcomes. It is true that risks are involved with this advanced technology, but currently it is properly in harmony and its prospective benefits are more important than its harms. Law and policy makers should not implement rules that would unjustifiably restrict implementation of gene therapy. In fact, we must examine our own dealings considering short- and long-term outcomes of the earth atmosphere. Though researchers have sorted out few threats, but ethically the long- and short-term known and unknown threats should also be considered for maximum progress forward with biotechnology and research.

Implications and implementations

The two types of gene therapies, germline therapy and somatic cell therapy, differ from each other in significant ways. Somatic cell therapy looks for the treatment of damage to body cells other than gametes. A population with genetic discords could be cured with somatic cell therapy and much advancement has recently been made. To treat a person's reproductive cells (sperms and ova) means altering the genetic composition of the family. Germline modifications for individuals should not be forbidden completely. Improved organisms should be meticulously examined and evaluated in out-of-the-way situations before leaving them in the environment to live. However meticulously prearranged, the special risks

caused by human germline modifications requires that each anticipated amendment be cautiously appraised, not only with regard to instant benefits and problems, but also keeping in mind the impact that the amendment may have on the collective future structure and allocation of public goods. Some people have contrasted gene

therapy to a Pandora's Box. If fabulous correlations are suitable, an enhanced individual would be a contrast to the gift of fire from Prometheus: genetic treatment can provide enormous benefits, so long as it is used practically and cautiously synchronized and restricted.

REFERENCES

1. Supreme Court of the United States, Burger WE. U.S. Reports: *Diamond v. Chakrabarty*, 447 U.S. 303.(1980). (Online). Cited January 1, 2017. Available from: URL: <https://www.loc.gov/item/usrep447303/>.
 2. Levine J, Suzuki D. *The secret of life: redesigning the living world*. Boston: WGBH.1993.
 3. McCreath K. Production of gene-targeted sheep by nuclear transfer from cultured somatic cells. *Nature*. 2000;405:1068-9.
 4. Beauchamp TL, Childress AF. *Principles of Biomedical Ethics*. (5th Ed.). New York: Oxford University Press. 2001.
 5. Aroskar AM. Anatomy of an ethical dilemma: the theory. *American Journal of Nursing*. 1980; 80:658-63.
 6. Bostrom N. Human genetic enhancements: a transhumanist perspective. *Journal of Value Inquiry*. 2003;37:493-506.
 7. Cooley DR. Deaf by design: a business argument against engineering disabled offspring. *Journal of Business Ethics*. 2007;71:209-27.
 8. Green RM. Last word: imagining the future. *Kennedy Institute of Ethics Journal*. 2005;15:101
 9. Alhoff F. Germ-Line genetic enhancement and Rawlsian primary goods. *Kennedy Institute of Ethics Journal*. 2005;15:39-56.
 10. Ethical Issues on Genetic Engineering Philosophy Essay. (n.d.). Retrieved Jan 7, 2017, from <https://www.ukessays.com/essays/philosophy/ethical-issues-on-genetic-engineering-philosophy-essay.php>.
-