

Genetic testing and gene editing



**ASSIGN
BUSTER**

Part 1

From the link provided in Assignment Paper C information, I found an article titled “ *Ethics of Genetic Testing*” by Margaret McLean. This article tells a story about a mother and daughter at a doctor’s office undergoing a test to determine if the daughter has the genetic mutation responsible for Huntington’s disease. From the results, the daughter hopes to make the decision on whether or not to have children of her own. I find this technology fascinating. Having the ability to make life decisions based on this technology could lead to a much healthier and stronger human race. For instance, knowing that you are a genetic carrier for breast cancer, you could decide not to have children and prevent the spread of this genetic trait. Furthermore, the discovery of these mutations wouldn’t have been possible without the study of the human genome sequence provided by the Human Genome Project, a study started in 1990 to map the complete set of genes for humans (McLean, 2015).

The first question I have pertaining to this research and technology is, if we could test ourselves for every known genetic diseases would we want to know our fates? For instance, if we have the technology to know whether or not we’ll end up with cancer, Parkinson’s disease, muscular dystrophy, etcetera, would we want to know? Would knowing only lead to depression and diminished happiness. This question is critically important because if we are not willing to put this research to use, funding for the Human Genome Project and the data collected from this research is all for nothing.

The second question I have is, since this article was written, what other technologies have been created to put the data to use? Now that we have all of this data and know exactly how the human genetic makeup is structured and we can find genetic diseases and anomalies, is there any new technology that can be put to use to correct these diseases and anomalies? This question is critically important because again, there doesn't seem to be any point in the Human Genome Project if we have no use for the data collected.

The final question is, with the new Human Genome Project knowledge and subsequent technology, how far do we intend to go with gene editing in the future? Is it ethical to correct the genetic anomalies in fetus' to ensure that a child is anomaly free and therefore create a genetically perfect child? This question is critically important because we need to ensure we set standards in the ethics of this technology and how far we are willing to take this technology into the future. Just because we can, doesn't always mean that we should.

I have found the following reference sources to assist me in the research for the aforementioned questions: Evaluating the psychological effects of genetic testing in symptomatic patients: a systematic review (https://link-gale-com.ezproxy.umuc.edu/apps/doc/A211631873/AONE?u=umd_umuc&sid=AONE&d=6d1e3ec3). CRISPR genome editing and its medical applications (<http://eds.a.ebscohost.com.ezproxy.umuc.edu/eds/pdfviewer/pdfviewer?vid=1&sid=6cf0f21f-707f-4eac-acac-5ad4a41e396f%40sdc-v-sessmgr02>). Human Genome Editing: Our Future Belongs to All of Us (<http://eds.a.ebscohost.com.ezproxy.umuc.edu/eds/pdfviewer/pdfviewer?vid=1&sid=6cf0f21f-707f-4eac-acac-5ad4a41e396f%40sdc-v-sessmgr02>). <https://assignbuster.com/genetic-testing-and-gene-editing/>

edu/eds/pdfviewer/pdfviewer? vid= 5&sid= 3cdefc44-0d37-4e78-b06e-afc72c0a345a%40sdc-v-sessmgr01).

Part II

Imagine yourself driving from point A to point B while utilizing your vehicles onboard navigation system. Along the way, your navigation system notifies you that there is an accident ahead in your route and offers you an alternate route to take to your destination. While this new route will avoid the traffic jam and you will not have any delay, it will add about ten miles to your overall trip and there are other hidden dangers along the way that cannot be identified. Would you take the new route to avoid the delay, even with the added mileage and dangers? In 1990, a research project titled “ The Human Genome Project” or HGP for short, sought to map the genetic makeup of the human race. In doing so, the HGP uncovered thousands of anomalous genes that cause genetic diseases. The causes for diseases such as cancer, multiple sclerosis, and thousands more have been identified and may potentially be edited to eradicate these diseases in the future with gene editing technology. With the existence of this mapping technology, would you like to know if you are destined to develop cancer, Parkinson’s disease or another life altering disease, even if you knew the technology to cure this disease is not yet available? What technologies are being created to put this knowledge to use and end the suffering from these genetic diseases? Can these newly created technologies be used to completely modify the genetic errors in a fetus, thus ensuring a completely disease free human race? If so, are we playing God and is it ethical to do so?

Studies have been conducted to determine the psychological state of patients who've undergone genetic testing both pre-symptomatic and symptomatic of a genetic disease such as cancer. These studies were conducted to determine if there was a significant increase of anxiety or depression in patients who have undergone genetic testing to determine if an inherited genetic disease is present. According to Vansenne et al "[symptomatic] patients appeared to have a lower perceived general health and higher levels of anxiety and depression than presymptomatic subjects before genetic testing" (2009). This theory suggests that individuals who were unaware that they were predisposed to genetic disease underwent less psychological distress caused by the results. On the other hand, patients who were aware of a genetic disease, such as cancer, who've completed genetic testing were more likely to experience increased anxiety and depression. Margaret McLean, in an article titled " Ethics of Genetic Testing: When what we know outstrips what we can do" writes about a woman going through a genetic test to determine if she is a carrier of the gene for Huntington's disease prior to starting her own family (2015). In this scenario, utilizing a genetic test could provide vital information in decision making and possibly prevent a horrible death of a child. As you can see, with this information, it is safe to say that the want or likelihood of someone undergoing genetic testing is circumstantial.

Genome editing is nothing new. We've been genetically modifying plants for decades. Genetically modified plants such as corn, soybean cotton and more have been in production and widespread use since the 1980's. The data learned from the modification of plants has led to multiple technologies and

systems for gene modification and editing. Most recently, a technology called clustered regularly interspaced short palindromic repeat or CRISPR for short has made huge advancements in the field. “ CRISPR has more potentials and applications compared to previous systems” (Mahmoudian-sani, et al., 2018). This technology has the ability to find specific regions of DNA, cut out a specified portion and even install new genetic code into the cellular DNA. With this, anomolous DNA code could be removed and replaced with correct or modified code, virtually erasing genetic disease. Although CRISPR shows promise, vast improvements need to mbe made before it is considered a viable option for humans (Mahmoudian-Sani, et al., 2018).

Ethical considerations are also important with the use of genome editing and manipulation technology. Recently a Chinese scientist named He Jiankui announced that he succeeded in editing the genes of newborn twins making them resisntant to HIV, possibly the first use of CRISPR in human embryos. Some scientists are calling for a moritorium on the use of gene editing in embriotic cells due to ethical concerns.

References:

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