

## **Designer Babies: The Ethical and Societal Effects**

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It's a process; It dates back to 12,000 BC when human beings started domesticating animals. Unknowingly, at the time, we participated in an act of science: genetic modification. It is a process in which humans influence the genes of another specie. Many believe this process is the same as genetic engineering; however, there is a difference. Genetic engineering is defined as the artificial modification or manipulation of an organism's nucleic acids or DNA. The difference is the matter in which the genes are manipulated. Through genetic modification, natural changes are made to a specie, while through genetic engineering, tools or technologies are used to modify or manipulate a certain gene. The process of genetic engineering isn't natural. This is a key component that set these two terms apart, but they are very similar nonetheless.

### **Background: Genetic Engineering**

Genetic engineering was first introduced nearly fifty years ago by Herbert Boyer and Stanley Cohen. At first, this technology was used on plants to increase the yield values of certain farm crops. Undoubtedly, it has provided a great advancement in the economy. Brookes and Barfoot (2014) found that since the first significant amounts of genetically modified crops were planted in 1996, there has been more than one hundred and sixty-six billion dollars generated from the agriculture industry. The production levels have also increased substantially. The success of GMOs and genetic engineering has sparked curiosity in the United States. As a result, geneticists have continued their research and have discovered a new technology. A technology that will not only transform the world we inhabit, but humanity as well. It will pave the way for the birth of a new specie, the designer baby.

## **Germline Engineering and CRISPR**

CRISPR Cas 9 is the newest form of genetic engineering; It is more efficient than previous methods. Mariscal and Petropanagos (2016) state that CRISPR offers the opportunity to break, repair and replace targeted strands of human DNA; a genetic engineering version of a simple cut and paste from a Word document. This CRISPR technology falls under a form of genetic engineering called germline engineering. Germline engineering occurs when genes are changed in egg, sperm, or early embryonic cells. This form of genetic engineering is inheritable meaning that the changes being made to the cells will be inherited not only by the offspring, but by the generations that follow. This product will allow the opportunity to remove gene linked diseases from the realm of inheritance. With CRISPR, the future for humanity is bright. Now, there's the potential for not only constructing a healthier society, but in some opinions a stronger one too. It's important to be careful of this technology. CRISPR has great power, and such power raises an important question: how can we regulate such a practice?

### **Forms of Regulation**

Undoubtedly, CRISPR has sparked great interest in the science world; however, some countries are wearier than others. In Europe, they operate a bit differently from the likes of the United States when it comes to new technologies. There are two different ways to regulate a practice. One is exemplified by the United States and the other is exemplified by the likes of the United Kingdom. In the United States, for the legality of new technologies, we operate on the presumption of innocence meaning that the technology is innocent until it is proven guilty. This guilty verdict could come forth with the discovery of a detrimental or devastating side effect. The United Kingdom, on the other hand, usually plays it safe. Their belief is that a technology shall be guilty until proven innocent. This operation prevents a technology from gaining too much power. Only until recently, the UK made an exception to their rule. In 2015, the UK Parliament passed regulations allowing the use of mitochondrial replacement techniques which had been a long-standing prohibition against modifying embryos (Scott and Wilkinson, 2017).

Technologies such as genetic engineering have the power to manipulate a great population, and they will if they aren't regulated correctly.

### **My objective**

This essay will discuss the topic of genetic engineering and designer babies. I will investigate the societal and ethical effects the prospect of designer babies brings to society. So far, I've already discussed the main topic of genetic engineering and the new technology of CRISPR. First, I will discuss and define eugenics, then I will explain the difference between positive eugenics and negative eugenics. CRISPR presents itself as a rousing technology that does indeed have consequences and has forced humans to form various opinions; so, in this paper, I will analyze three different perspectives regarding what humanity should do with such a powerful technology. The first perspective is that humanity should legalize CRISPR and should allow or either require it to be incorporated in modifying the human genome; By legalizing CRISPR, individuals will become more intelligent, attractive, and efficient while also becoming less unique. The second perspective is that only germline engineering should be legal to eliminate disease-ridden genes to ensure equality by constructing a healthier society. Finally, I seek to support the perspective of banning CRISPR across the world as the technology is too powerful and the consequences being discussed appear too large.

### **Eugenics and History**

The work of 19<sup>th</sup> century scholars Charles Darwin, Herbert Spencer, and Gregor Mendel focused their efforts on explaining how the internal traits that caused variations plants, animals and humans affected their ability to adapt and survive (Black 2003). These concepts developed into a new theory of how to improve the human species. This theory was coined eugenics in the later 19<sup>th</sup> century by British sociologist, Francis Galton, who happened to be related to Charles Darwin. Eugenics is the idea that an improved population is one that shares the same desirable traits. However, there are traces of this concept with the early Greece and Greek philosopher, Plato. He believed selective breeding created the best

chance for a successful progeny (Galton 2018). Successful progeny offers the opportunity for this population to be more united than a population that doesn't practice selective breeding. A united population reduces conflict, violence and potentially, wars. The practice of selective breeding would be an example of positive eugenics as it advocates for the best people in society to have more children (Allen 2001). Negative eugenics, on the other hand, was practiced by the Hitler and the Nazis in World War II. Negative eugenics advocates for reduced rates of reproduction for those who have less desirable traits. Hitler nearly exterminated the entire Jewish population. He used eugenics to support his evil and immoral actions. He believed the Jews were an inferior race and with their removal, Hitler believed humanity would be strengthened. Genetic engineering would bring back eugenics with no one to stop it.

### **Human Genome Implementation**

Throughout history, humanity has used technology to its benefit by making everyday life simpler. We've reduced the amount of work we're forced to do. A washing machine reduced the need for human effort while accelerating the process at the same time. This is just one-way humanity has manipulated the world around them for their benefit. Yet, these modifications haven't satisfied humanity. Having said that, recently, we've discovered something that may satisfy our needs. CRISPR allows the possibility to enhance human capabilities. Where does this desire come from? Savulescu (2005), an Uehiro Professor of Practical Ethics at the University of Oxford, believes this innate desire to be better does not arise from eugenics but is rather human nature. We, as humans, constantly search for methods to improve. This innate desire to be better is biologic. Eugenics is not the fuel of CRISPR. However, genetic genome editing isn't a natural process. I'm not saying the goal of this technology is to bring forth a new stronger specie that would crush those who weren't genetically modified; but, this seems to be a potentiality if this goal of human genome editing is realized nonetheless.

### **Human Genome Implementation: The Moral Obligation**

The implementation of CRISPR to the human genome will enable the birth of the designer baby. We've discussed the ability of humans to manipulate other species. This technology, however, presents the first real opportunity to genetically modify ourselves. Yes, we've been able to maximize our capabilities with drugs such as Adderall and Ritalin that have become more available to the growing population; however, the process of taking such a pill is not genetic. These alterations could last generations, or perhaps be permanent. These potentialities are enticing; however, would creating a designer baby be a moral process? Savulescu (2005) argues that we have a moral obligation to enhance as it promotes our human well-being and it helps treat and prevent disease. I would agree, like any sane individual, that treating and preventing disease is an act of good morality; however, is enhancement really considered moral? It would only be moral if the definition of enhancement is strictly confined to the act of preventing disease. If the government stood by this definition and permitted geneticists to solely use CRISPR to target disease ridden genes, there could only be two perspectives about this technology. Also, when speaking of enhancement, the first thought that came to mind wasn't of someone having their disease-ridden genes removed. It was more so an image of Barry Bonds taking a PED or a performance-enhancing drug. In addition, there is no morality behind the use of a PED; it creates an unlevel playing field. It doesn't represent natural competition as the two baseball players are no longer equal. As the technology, the PED, has diluted the scientific experiment. This example parallels what CRISPR would do to competition amongst individuals in society.

### **Genome Modification: Eugenics**

We've discussed the prospect of eugenics, but only in terms of a historical setting. Now, we must investigate how the new genome editing technique of CRISPR has the potential to revitalize eugenics. Selgelid (2014) believes that the reputation of eugenics has been tarnished by history. I would agree that eugenics has received a bad reputation because of history, but I would argue that eugenics can never be practiced in a morally sound instance. Essentially the goal of eugenics is to eliminate the least desirable traits from society. There are two approaches to achieve this goal. The first approach would probably

consist of a mass genocide of everyone who's considered to have less desirable traits. Shinwari, Tanveer, & Khalil (2018) believe this procedure parallels the extermination of the Jews in World War II. An immoral and inhumane act that is irrefutable. The second approach would be to prevent everyone with the less desirable traits from reproducing. These people would be forced to receive a hysterectomy or vasectomy. Again, another approach that breaches ethical grounds. Eugenics strips certain individuals of their rights. The right to reproduce was bestowed upon us when we were born; it is a birth right given to every man and woman regardless of their eye, hair, or skin color. CRISPR will strip us of the characteristics that makes us human. It will mess with our soul. Hitler believed humanity is stronger if it is made up of an Aryan race. Genetic engineering might enhance our abilities, but it won't make humanity stronger because we will no longer be human. Savulescu (2005) believes this innate desire to be better does not derive from eugenics but is rather human nature. I understand his point and I agree. I think he offers insightful reasoning for his claim. I agree that this innate desire to be better is biologic. However, genetic editing of a genome isn't natural. Being better and eugenics are a bit related in that must find the If CRISPR is used to construct designer babies, I see two futures for humanity.

### **Genome Modification: Potential Societies**

Let's take a glance at the first scenario. If the government can't fund CRISPR, who would be able to obtain the practice? There's no possible way this prospect becomes governmentally financed; the United States economy has nearly twenty-one trillion dollars in debt and it continues to rise. Even the idea that this practice be governmentally funded is what most Republicans would call 2016 Democratic Presidential nominee, Bernie Sanders' idea of making college tuition free, absolutely absurd. However, Saunders' idea wasn't too far off. He wanted to increase equality by helping those who are less fortunate. However, in a society that is dominated by wealth, socio-economic status and technology, equality doesn't stand a chance. Salkever and Wadhwa (2017) argue that this new technology will be available to the upper class as they will be the only ones that would be able to afford it. The poor will become less able to compete and make a living. It appears to be a form of natural selection, but it isn't. It's a

predestined arrangement based off the success and merit of one's family; it is unethical. Not only does this compromise ethical ground, but it also complicates society. The gap between the rich and the poor will only grow. Fukuyama (2002) believes that these children of choice who have been genetically selected by their parents for certain characteristics may perhaps think, act, and feel differently from those who weren't chosen and in time will think of themselves as different kinds of creatures. Fukuyama doesn't simply claim that society would be more divided, he believes that there would be a new specie in society. This new creature would not only complicate the goal of eugenics but derail the opportunity of a eugenic society from ever occurring. Equality isn't attainable when the product of genome editing is privatized. The introduction of CRISPR through the private sector of the economy will only ensure greater divisions in society with the introduction of a new specie.

Selgedid (2014) states that the new liberal eugenics grant individuals the right to choose whether to employ the genetic technologies on reproductive processes. If genome editing becomes a reality, there won't be a choice. Refusing the genetic technologies would leave your offspring at severe disadvantage. They wouldn't be able to compete and those who are genetically modified would prosper; as a result, the new liberal eugenics would no longer exist, and society would be as doomed as the society of Aldous Huxley's (1932) *Brave New World*. A world dominated by an elite group of individuals that control the genome editing of each individual; everyone serves their role in the assembly line, doing the job they were designed to do. Individuals are emotionless until they take a drug. This dystopian future strips society of two crucial and vital aspects: individualism and diversity. They've both played important roles in making us the intelligent beings we are today. They make us human. Without individualism and diversity, human interaction would be rendered pointless. We wouldn't be able to encounter new perspectives and learn new different information. Our mistakes would surely be reduced through genetic alterations which is unethical when discussing the prospect of learning. Furthermore, learning sparks advancement. This advancement is not technological; but, rather, an advancement of our naturalist intelligence, understanding of living things, spatial intelligence, visualizing the world in 3D and

interpersonal intelligence, sensing people's feelings and motives. We are aware of the world around us. If the CRISPR technology became readily available to everyone, our species would be lost. We would no longer have any individuality and no soul. We would become mere clones, simply created to serve a role in a world centered on efficiency. In this society, would we even be identified as human? No, we couldn't be. We have nothing that distinguishes ourselves from one another. We have no drive nor desires. We have no emotion, besides a capsule that provides a feeling of happiness that is in reality a mere illusion. In this world, humanity would fall with the dawn of a new specie.

### **Human Genome Implementation: A Fundamental Right**

In 2014, a study done by Motoko Araki and Tetsuya Ishii of Hokkaido University in Japan found that twenty-nine out of thirty-nine countries had a complete and outright legal ban on genetic editing (Gould and Loria 2015). Since then, things have changed with the development of a new genetic editing technique called CRISPR/Cas9. The genetic engineering field seems to be gaining some ground. Governments are allowing more scientific research and experimentation with CRISPR. In 2014, the United Kingdom, who usually stands by 'a guilty until proven innocent' motto, decided to permit the use of mitochondrial replacement techniques in 2015 (Scott and Wilkinson 2017). This is a problem. Once research and experimentation have been done on a technology, it is hard or damn near impossible to reverse the trend. To make matters worse, once this technology is practiced on the first human genome, it would be protected by the Fifth Amendment of the Constitution (Ossareh 2017). Time is running out. If states tried to create laws banning such a practice, the federal law would will reign supreme. The federal government will never ban genetic engineering; It presents too great of an economic opportunity for our capitalistic society to pass up on. If we wish to preserve humanity, we must issue a ban of such a practice. The first designer baby will be the end of humanity as we will be stripped of our individuality and diversity.

### **Germline Editing: Disease-Ridden Genes**

After discussing the first perspective, we've learned that CRISPR is a powerful technology that could help humanity influence the world in a positive way. On the other hand, we learned that human genome editing using CRISPR could breathe new life into the immoral act of eugenics while also hindering the process of equality within society. So, should we just give up on technology that offers so much potential? In this section, I will investigate the morality and societal effects of germline editing of disease ridden genes. This perspective limits the power of CRISPR, while also using it for the benefit of many individuals.

### **Germline Editing: Societal Effects**

Using CRISPR to repair and replace genetically diseased ridden portions of DNA in search for equality is justice. Saving lives presents a win for equality and humanity. Looking after one another is essential for the survival of humanity. Walsh (2015) has found a story in which woman named Layla suffered from Leukemia, however, CRISPR saved her life. It has the potential to save millions of lives. It can perhaps cure HIV/AIDS. People around the world die from genetic inherited disease such as sickle cell anemia and cystic fibrosis (Ly, 2011). This technology provides the possibility to help and cure these people. A world where families no longer live in fear of these inherited diseases. We don't have to put up with it any longer. We could take a closer step to societal equality. However, I believe we shouldn't allow germline engineering to be legal. It increases the population of our planet and it is approaching our projected capacity. Thomas Malthus' *Principle of Population* asserted the claim that population growth will always surpass resources unless it is brought unto balance by a positive check (wars, famines, diseases) or preventative checks or rather reproductive limitations (Adelson, Engell, Ranalli, and Van Anglen, 2008). In such a case, an immoral decision; however, it's an argument in which I consider the options being either life or death. Our population is about seven and half billion and our capacity is ten billion. Some might ask: what are you so worried about? We're only three-fourths of the way there. Well it's true, but we're projected to grow to eleven billion in less than a century. As a population continues to grow, the reproduction levels skyrocket. We need to persevere as much as time as possible until we find a

solution to the exhausted resources. Although this is presented as a harsh reality, the genetic disease serves as positive check that helps keep the population at sustainable level. It is not a form of eugenics, as it is a naturally occurring process. It's similar to a form of natural selection.

### **Germline Editing: The Morality**

This great technology is important for those with sickle cell disease and muscular dystrophy as it can help save their lives (Corn, 2016). It is certainly powerful enough to help many people with genetically inherited diseases. However, it poses many moral dilemmas. I've touched a difficult moral dilemma already in which I favored the greater good of humanity over the health of individuals born with genetically inherited diseases. A moral question that needs to be raised is: where do we draw the line between fixing disease-ridden genes and enhancing human abilities? Murray (2014) believes that getting rid of disease is one thing but using it to manipulate genes for desirable traits is something completely different. This will be tough as different traits are linked to the same DNA, so the modification will perhaps repair and enhance. Ishii (2017) believes it is essential to understand the differences between genetic manipulation of disease ridden genes and genetic engineering for enhancement. Also, what qualifies us to denote the quality of life of some individuals who suffer from these diseases. We can't act blindly; we must ask questions. Another moral question that is posed regarding CRISPR and germline engineering is: Would it be worth saving the people who suffer from genetically inherited diseases if it led to the genetic editing of the entire human genome gaining substantial power? What if this genetic editing of the entire genome had created Aldous Huxley's *Brave New World*? Yeah, I wouldn't either. Olesen, Nor, Amin, and Ngah (2017) argue that the slippery slope is of one the most dangerous aspects of genetic engineering. It is an aspect that is hard to avoid when dealing with such a new and innovative technology. However, I still believe CRISPR is a technology to fear. We are already consumed by the technology that surrounds us. Although this is presented as a harsh reality, the genetic disease serves as positive check that helps keep the population at sustainable level. It is not a form of eugenics, as it is a naturally occurring process. It's similar to a form of natural selection.

## **Genome Editing: Not Today**

Geneticists, somewhere, are running experiments on CRISPR/Cas9 technology. Dey and Banerjee (2017) believe this technology has become revolutionary for the realm of genetics. This notion of a ‘revolutionary technology’ may have played a role in the laissez-faire economic regulation or lack thereof from the government which allowed geneticists seize control of the market. Geneticists are running haywire through their infinite studies and their expensive research. The prospect of human genome editing is terrifying. Benston (2017) believes the public fear of genetic engineering is comparable to vaccinations in that our fears are inflated. I don’t agree. I believe our society is prudent; it’s better than having a society that is blind to the certain externalities. Pollack (2015) states that CRISPR/Cas 9 and other human genome practices should be banned due to their increasingly growing power. He’s right. These technologies are growing stronger and more powerful every day.

## **Societal Problems of Today**

Humans are species of intellect that continually strive for improvement. That’s why this technology is so enticing. The genetic alterations we will undergo have the potential to make an imprint that will last generations. Genetic engineering doesn’t have to be legal, for the rich to thrive. Genetic engineering will only enlarge the gap between the rich and the poor. Salkever and Wadhwa (2017) draw attention to the trend that assortative mating is rising. Assortative mating occurs when two people of similar socio-economical levels have a child. Thus, a wealthy man will marry a wealthy woman and together they will have a newborn that will be inherently more desirable. This assortative mating will only be continued when the offspring finds another offspring of similar socio-economic status and the inequality gap that was already large, will grow. This is a present-day version of eugenics with money serving as the sole desirable trait. There’s no way to inhibit two people from marrying without breaching their rights through a compromise of ethics. However, if we allow genetic engineering to enter this market, the problem of this eugenic marriage practice in society will only worsen. As the rich will only be able to afford the practice. The rich won’t attempt to repair broken parts, but rather tweak the perfect parts

(Pollack, 2015). There is no ability for the rich to tweak their genetic traits today. However, if we allow CRISPR to edit the human genome, society is doomed because there's no incentive for the rich to stop making genetic alterations; if they did stop, they risk falling behind another rich family. Competition will force them to continue. These rich families will feel empowered. This technology will allow them to dominate the world in the return of eugenics (Pollack 2015). The rich will have constructed the perfect human. This is horrific for society as the poor would be devastated by an increased socio-economic gap. Society will become more forged than ever before. Like, I argued earlier, this will not be an enhanced human, but, rather a different species (Fukuyama, 2002).

### **Making the Practice Illegal: Ethical Questions**

It is certainly immoral to prevent germline editing of disease-ridden genes of those who suffer from muscular dystrophy and sickle cell anemia. However, this unethical act is only justifiable for the precaution and safety of humanity as the population continues to grow closer to its capacity. If we allow, germline editing to save these lives we're breaching science ethics. Natural selection is the only ethical process that allows species to adapt over time. Morality reigns supreme in a world in which humanity is not dealing with environmental dilemmas. Choosing not to implement this technology is argued by some like to breach our moral obligation to advance. I would agree as human beings we center our societies on advancement, but how can we advance when we're currently dealing with problems that would only worsen with this technology? Equality would worsen as the socio-economic gap would widen. Every problem would be compounded.

### **The Societal Effects: Summary**

Currently, society suffers from socio-economic inequality. The implementation of human genome editing would only make the gap between the rich and poor larger. The rich would receive the practice and would continue to have power potentially through their grasp on the economy if they're big business owners. Also, this technology would create a new species living amongst humanity. Although genome

editing brings back the prospect of eugenics, this society would not be united at all; on the contrary, it would actually be more divided than ever before. This technology will only compound the current problems that engulf society. For germline engineering and modifications of only disease-ridden genes, society's genome equality would surely improve. However, the inequality between the rich and poor won't be reduced. If we were to make genome editing illegal, we eliminate the risk of worsening the socio-economic gap. Also, by eliminating genome research, we would surely have greater opportunity to attack the problem head on.

### **The Moral Questions: Summary**

This technology certainly poses threats to humanity through the revival of eugenics and its assault of individuality and diversity. The notion that it is our moral obligation to enhance through genetic modifications of our genes is actually absurd. It isn't moral because it defies the natural acts of science. Also, this technology is unethical due to the likelihood eugenics would come with its implementation into the human genome. If CRISPR were to be used only to repair and replace genes that cause diseases such as muscle dystrophy, it would be moral. It would help the people who suffer from this disease; but, it would also unlock the possibility of a slippery slope in which we could stretch the term repairing to enhancing. Walton (2017) warns that genetic modifications to repair disease-ridden genes can led to entire editing of the human genome. The slippery slope is plausible given the fact that humanity is constantly searching for new advancements and improvements.

Each perspective offers a unique path for society. First, by banning CRISPR and other genetic engineering technologies, we ensure the safety of humanity in the future. Although, we let some continue to die because of disease-ridden genes, we have looked out for humanity as we've disallowed the rebirth eugenics from occurring. Second, germline engineering should not be practiced due to moral dilemmas and the societal problem of overpopulating Earth nearing. For humans, we must compromise our morality while considering the survival of humanity. However, the power of CRISPR is overwhelming and we would not be able to stick to editing only disease-ridden genes as humanity. Due to our natural desire to

improve, we would seek further modifications and will suffer from a slippery slope. The final option was to use CRISPR to enhance society. We would create a world that would not be filled with superhumans, but rather a new specie. Genetic engineering would remove what Fukuyama (2002) calls Factor X which makes each individual human. This option provides the most risk-reward tradeoff. In conclusion, I believe we should ban this practice, if this is not possible, only germline engineering should be allowed as full access of CRISPR to the public will cause insurmountable damage beyond repair.

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