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### **Eugenics: The Pathway to a Brighter Future or a Slippery Slope of Immorality?**

Imagine a future devoid of disease. Envision a world where every child is born in perfect health. Advances in the field of genomics have made this far-fetched dream more and more of a realistic possibility. As scientists continue to gain a deeper understanding of the human genome and how it can be manipulated, sophisticated gene therapies have begun to develop. Moreover, the field of eugenics opens the door to the possibility of selecting a child's genes even before birth to completely prevent inheritance of disease-linked genes. While few would be opposed to using eugenics as a means of disease prevention, there are many who oppose the idea of gene selection for traits that are not necessarily disease linked. There are also many who believe that parents should be allowed to choose whatever traits they would like in their future child. In addition, there is also a group in the middle that believes that parents should be able to select for some traits and not others. All in all, eugenics poses a very serious moral question: where should the line be drawn?

Although eugenics may seem to be a more modern development, the idea of selecting traits to be passed on to future generations is certainly not a new one. It can be traced back as early as 1803 when Robert Louis proposed the idea of "megalanthropogenesy." He suggested that men seen as having superior abilities should be selected by the government to reproduce with women who displayed similar desirable

traits. Later, the idea of disease prevention through eugenics seemed to make its way to the forefront of the political agenda in the 1900s in the Scandinavian countries in the form of sterilization laws. The main target of these laws were those with mental illness who were often forced into being sterilized in order to prevent future generations from inheriting genes that would leave them with mental retardation. The idea was that this would cut costs for the state due to a decrease in the need for institutional care and relief for the poor (Dikötter). A similar idea arose in the United States around this time. The idea of preventing those seen as “unfit” from reproducing became increasingly popular within the general population. In fact, 30 states adopted eugenic sterilization laws, which led to the forced sterilization of about 60,000 Americans (Norrsgard).

These types of eugenics can be classified as societal eugenics because they stem from the idea of targeting change at an entire population. The end goal of this practice is to better humanity as a whole. However, it is unclear what “better” is defined as. Is it ethical to say that a person who is healthy or intelligent or strong is inherently better than one who is not? This idea of certain persons being “better” than others has been the basis for discrimination and even genocide in the past. Just looking at Nazi Germany or the Rwandan Genocide, it is clear that this notion of certain groups of people being inferior to others is absolutely horrific and can result in terrible tragedy. While these are extreme examples, they do demonstrate the inherent issue with having certain people determining which types of people should exist and which should not. For this reason, it seems to be the general consensus that this practice of societal eugenics is immoral.

With the advanced technologies of today, there are ways of practicing eugenics without restricting who may reproduce and with whom. This allows for eugenics

practiced on an individual basis rather than by a society. Now, certain decisions of genetic make-up can be made when egg fertilization occurs in vitro, where egg and sperm are joined outside of the body, in a laboratory. From there, Pre-implantation genetic diagnosis can be used to detect certain genetic characteristics of the embryo before it is implanted in the womb. This can be done through methods such as fluorescent in situ hybridization. In fluorescent in situ hybridization, fluorochromes are used to label DNA probes and then hybridized in situ (in their original place) to metaphase or interphase nuclei (Delhanty and Harper). The use of polymerase chain reactions can also be used to amplify a single or a few copies of DNA creating many copies of a particular sequence of DNA (Fertility Authority). These two methods can be used to test for diseases such as cystic fibrosis and Duchenne Muscular Dystrophy, and based on these results, the doctor or the parents may choose which embryos to implant in the uterus. Research is currently being done to identify specific alleles associated with early-onset Alzheimer's, so that Pre-Implantation Diagnosis can be used to identify embryos at risk for this disease as well (Sandel).

Even at this stage, the ethics of this type of eugenics can be called into question. Some, such as those who follow the teachings of the Catholic Church, would argue that an embryo is human life, and therefore, aborting the unwanted fetuses would be a form of murder. For these reasons, a technique of germ line therapy has been developed. In germ line therapy, genes are inserted into the reproductive cells (egg or sperm) of a parent in order to replace a defective gene. This can also be used if both parents are homozygous in the trait that they are hoping to avoid passing on (Wales Gene).

Some might also argue that selective abortion of fetuses with certain genetic conditions indicates that those with disease are inferior to others, which would foster

discrimination against these people. On the opposite side of the argument, many believe that doctors should do everything in their power to rid the world of such diseases. Some might even argue that the doctors have a moral obligation to do so. However, most of the general population falls into a more moderate category, with the belief that each individual has the right to make this decision for his or her self if they would like to try to prevent their child from having a certain disease.

However, eugenics has already extended beyond the realm of disease prevention, generating a great deal of debate. For example, technologies now offer the possibility of sex selection. One way that this can be achieved is through pre-implantation genetic diagnosis. This can also be achieved using machinery with the ability to distinguish sperm carrying an X-chromosome (to produce a girl) and sperm carrying a Y-chromosome (to produce a boy). This device is called a flow cytometer, and is able to separate the two based on the fact that the X-chromosome contains more DNA than the Y-chromosome. This method allows for sex selection before fertilization, which does away with the pro-life argument that can be used to argue against the first option. The issue that does arise is that sex selection opens the door to sex discrimination. Looking at countries like China, where sex discrimination against girls is a huge problem, this is a very legitimate concern. Therefore, companies such as MicroSort have restricted the use of this technology to those who would like to use it for the purpose of creating gender balance within a family, not simply because they would like more children of a certain gender or would like to choose the gender of their first-born (Sandel). Placing these kinds of stipulations on sex selection seems to create a somewhat more morally sound way of giving parents a choice in the gender of their child.

Sex selection could serve other, perhaps more justifiable, purposes. There are over 400 diseases that are X-linked, meaning that they will more than likely only be passed on to male offspring due to the fact that females have another X-chromosome and are likely to have a dominating healthy allele on that chromosome. Thus, if the father has this type of disease or the mother is a carrier, they can prevent this from being passed on by selecting a female rather than a male child.

Beyond the choice of male or female, eugenics allows for the possibility of the creation of “designer babies.” For example, a person could decide that they wanted a particularly tall child. There are at present, treatments that allow children who are projected to be far below average height due to a hormone deficiency to grow to be taller than this projected height. This treatment, however, could also be used for the former situation, to make a child of average height taller. There are many forms of treatment that could play out in a similar way. A gene therapy cure for muscular dystrophy could be used to create children with incredible athletic ability. An Alzheimer’s treatment might allow for the creation of an exceptionally bright child (Sandel).

Many believe that parents have every right to choose these traits for their offspring. However, there are some valid points to be made against this. One possible outcome is that the world will essentially end up with two “classes” of people, the genetically enhanced and the non-genetically enhanced. If enough parents opt to create children with only the most desirable traits, average height, musculature, and intelligence will increase, leaving those unaltered to be below average.

Another issue to consider is that treatments are not cheap. Pre-Implantation Genetic Diagnosis in and of itself costs about \$6,000-\$9,000 for each cycle (Fertility

Proregistry). As more advanced eugenic treatments become available, these could be even more expensive. For this reason, the rich would be more likely to have access to them. This may perpetuate the “rich getting richer” because they could afford to create children with abilities which will allow them to be more successful in the future, while the poor are unable to compete talent-wise. While there is already a large disparity in opportunities between the rich and the poor, this could widen the chasm even further. One way to remedy this could be to provide subsidies for these types of enhancements, or cover them through insurance, so that all could have equal access to them. However, the question is if government money should be spent on this. Not everyone may want to pay a rather substantial amount of tax money to support these expensive practices. Perhaps if there were a way to practice the selecting of traits that was significantly cheaper, there would be a possibility of remedying this.

Another argument against these treatments would be that this could prevent children from making autonomous decisions. Giving a child an extra height boost might pre-determine that that child will play basketball. A child with a genetically enhanced memory might be destined for a future in the sciences. When a child’s natural talents are chosen in advance, it may be more difficult for that child to veer from that path to one of his or her choosing. However, the problem with this argument is that every child is born with more capability in certain areas than others. No child ever chooses his or her genetic make-up, so in a sense, no child can make completely autonomous decisions about his or her future.

Outside of these more specific issues, is a much more general one. Overall, is it ethical for humans to “play God”? Religion plays a strong role in answering this

question. Many who believe in a God would say that God should be the “designer” of human life, and it is not the parents' right to choose the genetic make-up of their child. Others who do not believe in God may still hold the same belief that humans should not try to overcome the powers of nature, and that it is better to allow life to progress as it was meant to do naturally. Some may argue that because science has progressed to this point, it is only natural for humans to use this knowledge to their benefit. Differing opinions on what nature is, as well as the importance of nature, make this a difficult question to answer.

Another argument against eugenics is that this will diminish the value of achievement. If people are successful simply due to an enhanced genetic make-up rather than hard work and dedication, this seems to take away what is so impressive about that success. While it can be argued that all success has to be somewhat due to certain genetic conditions, the extent to which this is true would be to a significantly larger degree with children who were genetically engineered to have certain talents. Striving for success is something that is deeply valued by many, and the idea of eugenics taking that away could be very troubling to some.

Personally, I believe that using eugenics as a form of disease prevention is certainly ethical, especially now that advanced technologies offer methods outside of abortion for selecting against diseases. Preventing the passing on of life-threatening or incredibly debilitating diseases in order to prevent tremendous suffering is a noble cause. Using understanding of the human genome to advance medical practices seems to be a very promising path as a whole, and with the a new focus on disease prevention over disease treatment, medicine seems to be taking a turn for the better.

However, I do not believe that parents should simply be allowed to design their own children with whatever traits they would like. For me, the problem arises when looking at the idea of mastery over nature. The belief of humans that they are all-powerful is one of the greatest follies of man, and I think that this is one of societies main problems today. When humans hold the belief that they are god-like, this creates excessive hubris and fosters selfishness. Being able to adapt to nature and appreciate the gifts that one is given is a way of keeping humans humble.

However, this is only one of many opinions, and debates on the topic of eugenics will most likely continue far into the future because there is such a great deal of uncertainty in what eugenics could bring. The movie GATTACA depicts a possibility of what the world could look like if it became routine for parents to choose the genetic traits of their children. The movie clearly shows discrimination against those with “inferior” genetic make-up, and very little left in the way of choice for each particular individual. This would indeed be problematic if eugenics did lead to a society similar to this. Although, it is important to keep in mind that this is only one of many scenarios that could play out, and while each person may have his or her own prediction, it is all simply speculation. Thus, it is important to approach this new available technology with caution, taking into deep consideration the moral implications of how this technology is used. The general populations should be educated properly on the matters of eugenics so that people are able to make well-informed decisions on how to use this scientific knowledge.



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