The Genetic Engineering of Humans

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Eugenics

Human genetic engineering has been occurring for much longer than most people realize. The Greek philosopher, Plato, wrote about genetic engineering in *The Republic*. He stated that "the best men must have intercourse with the best women as frequently as possible, and the opposite is true of the very inferior."[i] Indeed eugenics, the most basic form of genetic engineering, has been around since the dawn of western civilization. Being the strongest people was important in the ancient civilization of Sparta. To ensure superior strength, the Spartan elders would examine newborn babies and subject them to wine baths and exposure to the elements.[ii] If a newborn didn't pass the inspection and appeared weak, he was abandoned.

While these early forms of genetic engineering were part of long standing traditions, they were still controversial. Plato thought that the basic form of eugenics he presented in *The Republic* should be law. Recognizing that rating people and assigning them mates based on the rating wouldn't be popular, Plato suggested hiding it from the public by disguising it as a marriage lottery system. Despite these controversies, future generations continued to pursue eugenics.

Hitler was an avid proponent of eugenics, and ordered the sterilization of hundreds of thousands of people deemed "unfit."[iii] In America, eugenics was trumpeted by Alexander Gram Bell. Bell had been investigating the rate of deafness in Massachusetts and concluded it was hereditary. This led him to call for a marriage prohibition for the deaf. In 1907 the state of Indiana attempted to legalize the sterilization of patients in mental institutions. Connecticut passed laws prohibiting anyone who was "epileptic, imbecile or feeble-minded" from marrying.[iv] In 1927 the Supreme Court upheld Virginia's right to sterilize people it found "unfit." Overall between 1907 and 1963 more than 64,000 people were legally sterilized in the United States.

Given its controversial history, it seems surprising that people keep returning to eugenics. But people still hold hope that eugenics can provide a better society for all; a place where people are smarter, stronger, and healthier. In their 1994 book *The Bell Curve*, Richard Herrnstein and Charles Murray discuss the effects small changes in IQ might have on a society. Using a random sampling, they examined the effects of a 3 point increase. Herrnstein and Murray predicted that a 3 point increase would reduce the poverty rate by 25%, along with significantly reducing high school dropout and crime rates.[v]

Eugenics is clearly not a cut and dry subject. It has been used recently on the island of Cyprus to nearly eliminate a prevalent genetic disease.[vi] But its ability to improve a society must be weighed against its history of misuse. Today, the issues become even more complex as technologies improve. Recent technology now allows parents to choose the sex of their children before conception. This new and amazing ability has caused problems in certain regions of the world. China, for instance, now has significantly more men than women. The inability of Chinese men to find a mate has caused new social problems, such as the sale of brides and increased prostitution.[vii]

Direct Genetic Engineering

Beyond the selective breeding of eugenics is direct genetic engineering, what most people think of as genetic engineering. This is where one directly modifies the DNA of an organism. There are two important types of direct genetic engineering.

The first type, Somatic engineering, involves introducing new genes into an already grown person. This is the genetic engineering used in gene therapy. Viruses are used to accomplish the task of injecting new genes. A virus is modified to contain human DNA, and then injected into a subject. Since viruses work by taking over cells inside the body, it's a relatively effective way of delivering the desired DNA. The modified virus will "infect" the cells of the subject with the new DNA. This may prove to be an effective way of defeating genetic disorders, and the changes are not passed on to the subject's children.

The second type of genetic engineering is germline engineering. This is the modification of DNA in a zygote, the first cell created from the joining of an egg and sperm. This form of genetic engineering is inherently more controversial, because its effects are carried on in any children that the subject might have. Our current technology is limited to the first type of genetic engineering, but advances in animal cloning are bringing the possibility of germline engineering in humans closer and closer.

The right to be "better than well"

According to the World Transhumanist Association's declaration, human beings have the right to extend their physical or mental capabilities beyond human limitations. Unsurprisingly, the landmark case Griswold v. Connecticut comes to mind when we are discussing human rights. If humans have full freedom over their reproductive capability, then it is not unreasonable that they should have full freedom to modify their bodies using genetic engineering. Ironically, this contradicts what Dr. James Watson has to say about rights:

"Terms like sanctity remind me of animal rights. Who gave a dog a right? This word gets very dangerous. We have women's rights, children's rights; it goes on forever. And then there's the right of a salamander and a frog's rights. It's carried to the absurd.

I'd like to give up saying rights or sanctity. Instead, say that humans have needs, and we should try, as a social species, to respond to human needs – like food or education or health – and that's the way we should work. To try and give it more meaning than it deserves in some quasi-mystical way is for Steven Spielberg or somebody like that. It's just plain aura, up in the sky – I mean, it's crap."

So, what is this "rights talk" when it comes to genetic engineering of humans? One can interpret this right as natural right, also known as status-based right, or instrumental right. According to the article *Rights* published by the Stanford Encyclopedia of Philosophy, natural rights are governed by the concept of "good life." Therefore, if an individual chooses to undergo genetic engineering to achieve a better life, his cause is justified. However, the concept of a "good life" varies from individual to individual, from society to society, and from ideology to ideology. A person might define a good life as having exceptionally high IQ, while another might define a good life as having exceptionally strong body. Moreover, some concepts might outweigh the others. For instance, my desire to become physically stronger can be outweighed by somebody else's desire to be cured from a genetic disease.

On the other hand, instrumental rights are depicted as "instruments for achieving the optimal distribution of interests." Even though Dr. Watson's comment on rights seems critical, this kind of right is exactly what he means by human needs. Based on this definition of right, the cause for genetic engineering is justified as long as it benefits the society. For example, parents have the right to genetically enhance their children if they grow up to be professors, leaders, etc. However, Francis Fukuyama points out in his book, *Our Posthuman Future: Consequences of the Biotechnology Revolution*, that this approach will run into the typical problem of utilitarianism: "the question of priorities and justice when needs and interests conflict." Obviously, the society would be full of exceptional individuals because everyone has the justified cause.

Therefore, even if genetic engineering of humans become feasible, we would run into problems while trying to define the so-called "right to be better than well."

Opposition to Genetic Engineering

Many people oppose the genetic engineering of humans. The first and most commonly heard argument against genetic engineering is that we as humans shouldn't be attempting to "play God." This view is strongly supported by the Catholic Church. "The use of genetic modification to yield a superhuman or being with essentially new spiritual faculties is unthinkable," states an article released by the Vatican. "A man can only truly improve by realizing more fully the image of God in him by uniting himself to Christ."[viii]

Moreover, even when we try, we aren't very good at playing God. It took 277 cloned embryos to make Dolly, the now infamous cloned sheep. Of those 277 embryos, only 29 developed enough to be implanted into a surrogate mother. Twenty-eight were miscarried.[ix] Embryos that have undergone gene manipulation will most likely have even lower success rates, since it's a significantly more complicated process.

Another argument against genetic engineering is that of the genetic divide. As a society, we already struggle with class discrepancies. The divide between blue collar and white collar could easily become a divide between those genetically engineered and those not. The movie *Gataca* showed a very similar problem, one where people were screened and limited by the government based on their DNA. This form of genetic discrimination could easily grow as each new genetically engineered generation becomes further removed from its non-engineered counterpart.

It is usually assumed that genetic engineering will consist of small changes to human DNA in an attempt to enhance people. However, the technology could be used to make more significant changes. Would you like to have the eyes of an eagle, or nose of a bloodhound? Genetic engineering could be your solution. It could lead to a whole class of human-animal hybrids. And while superior vision sounds great, human-animal hybrids are more likely to take the form of work animals infused with human DNA so they are easier to control. This less pleasant possibility has spurred the call for a ban on cloning and species altering procedures. "Uncontrolled use of the new genetic technologies," says George Annas, a professor of Health Law at Boston University, "risks setting us on a dehumanizing road to genetic genocide."[x]

These new technologies aren't as farfetched as they may seem. Almost all insulin produced for pharmacies today comes from hybrid bacteria that are part human and part E Coli.[xi] In 2003, China produced the first human-rabbit hybrids. According to an article in the *National Geographic News*, "the embryos were reportedly the first human-animal chimeras successfully created. They were allowed to develop for several days in a laboratory dish before the scientists destroyed the embryos to harvest their stem cells."[xii]

Identity Tradeoff

Fukuyama argues that the most significant threat posed by biotechnology, or genetic engineering of humans in specific, is the possibility that it will alter human nature. But what is human nature anyway? According to Fukuyama, "...human nature is the sum of the behavior and characteristics that are typical of the human species, arising from genetic rather than environmental factors". The reason Fukuyama excludes environmental factors from the definition is obvious: the term "human nature" itself refers to the entire species. Furthermore, Fukuyama uses the word "typical" to "[refer] to something close to the median of a distribution of behavior or characteristics." Thus, one could interpret "to be close the median" as "to be within human limitations." Speaking in another way, human nature can be defined in terms of our own limitations. For instance, we are human because we can never

fly; or because we can never run faster than a leopard. Genetic engineering in humans, if feasible, will break the limitations, and consequently will alter our human nature.

The "GenRich" vs. The "Naturals"

In his book, *Consumer's Guide to a Brave New World*, Wesley J. Smith envisions a possible future where changes made by genetic engineering are so radical that humanity will be divided into two distinct groups: the Naturals, who don't have genetic enhances, and the GenRich who do. Furthermore, one can interpret that the Naturals are those who choose not to have genetic enhancements, or are those who cannot afford genetic enhancements. We think the latter interpretation is more likely in this envisioned future. When emperor Constantine established Christianity as an official religion, he didn't foresee that over the next thousand years the world will be divided by the religion. Muhammad didn't foresee that either when he founded Islam. Considering this, the future envisioned by Smith is very likely when genetic engineering of humans becomes feasible. In this possible future, how would one group look at the other? Friedrich Nietzsche, in his *Thus Spoke Zarathustra*, speculates:

"All beings so far have created something beyond themselves; and do you want to be the ebb of this great flood and even go back to the beasts rather than overcome man? What is the ape to man? A laughingstock or a painful embarrassment. And man shall be just that for the ubermensch: a laughingstock or a painful embarrassment…"

The concept of ubermensch, or superman, can lead to some dangerous interpretations. Hitler's interpretation of ubermensch led to the death of millions, whereas a Christian's interpretation centuries ago led to the ongoing conflict in Middle East. In the former case, ubermenschs are the white-skinned, blue-eyed Germans; in the latter case, ubermenschs are the faithfully devout. In Smith's future, the ubermenschs represent the genetically enhanced in every sense of the word. Obviously, compared to our society nowadays, which is divided between the rich and the poor, the futuristic society in Smith's vision is much darker.

Conclusion

The last question is, what should we do? Should we follow the conservatives and abolish genetic engineering of humans altogether? Or should we follow the transhumanists and embrace the future?

Aside from all the negative points presented in our paper, genetic engineering still has the potential to create a better future for humanity. For instance, a future that's free of genetic disorders, or natural lottery. Julian Savules argues in her article, *Justice, Fairness and Enhancement*, that "judicious use of enhancement, based on a rational policy can ensure that each of us, regardless of genetic or financial inheritance, has a 'fair go.'" Fukuyama also suggests that policies on biotechnology, or genetic engineering of humans specifically, should be strictly regulated. In the end, genetic engineering of humans is neither right nor wrong by itself; it only presents us with possible roads into the future, and it is up to us to pick the right one.

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