ARE WE CLOSER TO FREE MARKET EUGENICS? THE CRISPR CONTROVERSY

by Ted Peters

Abstract. Might the 2018 birth of two designer babies in China write the opening paragraph for the next chapter in the history of eugenics? The worldwide scientific community has tacitly put a moratorium on human clinical application of CRISPR gene editing, waiting until unknown risks can become known. But this ethical agreement has been breached, and calls are now being heard for more rigorous regulations. Perhaps religious and spiritual leaders can join the bioethical chant: the yellow light of caution is flashing.

Keywords: bioethics; CRISPR; enhancement; ethics; gene editing; therapy

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The first story of eugenics ended badly. The idea sprang from the imagination of Charles Darwin's cousin, Francis Galton, that we could improve the human race by limiting births to those who are intelligent, strong, and potentially wealthy. The idea caught on in Britain, France, Germany, and the United States. In the United States, it led to the castration or sterilization of the mentally disabled, physically disabled, and prison inmates. In Germany, it led to death camps and genocide. All in the name of enhancing the human gene pool.

Are we now ready for Chapter 2? A new way for planning good birthing is to edit out or edit in selected genes before pregnancy. Clinicians have at their disposal a revolutionary technique, CRISPR, that is relatively cheap and easy. CRISPR stands for *Clustered Regularly Interspaced Short Palindromic Repeats*. What this refers to is a set of palindromic DNA repeats now residing in our human DNA derived from incorporated bacteria and archaea. The take away is this: palindromic repeats of DNA base pairs provide targets for the geneticist to shoot at with an endonuclease, Cas9. With CRISPR/Cas9, geneticists can now delete a gene, insert a gene, or

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modify a gene. A revolution in gene editing technology has just taken place. Will widely available CRISPR technology lead to a new chapter in the human eugenics story?

It appears so. In 2018, the first genetically edited children were born. Well, at least that is what is being said.

Genetically Designed Twins in China

The births allegedly took place in China under the editing hand of scientist He Jiankui at the Southern University of Science and Technology in Shenzhen. Jiankui claimed to have edited the genomes of twin girls one day after IVF conception. He knocked out the CCR5 gene. By knocking out the CCR5, the pathway would be blocked for HIV to enter the immune cells. In effect, because of this gene editing, these two girls will be protected from HIV for the remainder of their lives. In addition, these girls will pass on their altered genes to their children. If this experiment holds up to criticism, Jiankui will have proof of the concept that gene editing can be used successfully for therapy, for disease prevention in humans.

Has the worldwide scientific community greeted this triumph with applause? By no means. Jiankui is getting booed the world over. Alta Charo, a member of the U.S. National Academy of Sciences Committee on Human Genome Editing, declared that Jiankui's work was "misguided, premature, unnecessary and largely useless" (Stein 2018).

Even though Jiankui's critics doubt the veracity of his science, the principal issue is one of ethics. Because we do not yet know what the long range consequences of gene editing might be, ethically concerned scientists have to date refrained from altering germ lines that could pass on today's editing to future generations. It is a matter of safety. At least for the near future, CRISPR gene editors cannot avoid a number of risks of the as-yet-unperfected technology: off-target effects, chimerism, unanticipated epigenetic factors, and unintended long-range consequences of even on-target alterations (Gouw 2018, 496–97). It is a matter of protecting our children from unknown deleterious effects. It is a matter of the Frankenfear at playing God with human health and well-being (Peters 2017, 2019).

The ethical consensus among scientists has been guided by seven "Overarching Principles for Research on Clinical Applications of Human Gene Editing" (NASEM 2017, 33).

(1) Promoting well-being
(2) Transparency
(3) Due care
(4) Responsible science
(5) Respect for persons

(6) Fairness

(7) Transnational cooperation

Evidently, these seven principles lacked the teeth to bite the editing hands of He Jiankui.

Therapy versus Enhancement

Actually, in addition to safety, there is a second ethical issue, one of equity and justice. It has to do with the distinction between therapy and enhancement. In the case of Jiankui's twins, editing out the genetic predisposition to contract HIV/AIDS is strictly therapeutic. This gene alteration will help protect the girls from a dreaded disease. With 4,000 to 6,000 human diseases traceable to genetic factors, we can easily dream of gene therapies that could relieve suffering on a very large scale. Our benevolent inclinations stir hope in us.

Such gene editing could have a second purpose, however. We might go beyond therapy to enhancement.

> Genetic *therapy* refers to the manipulations of the genome to treat individuals or their progeny with known diseases, disabilities, or impairments to restore them to a normal state of health. *Enhancement* refers to the use of genetic alteration, pharmaceuticals, devices, or other means to alter the normal workings of the human body or psyche or to be better than what is normal and native to healthy physiology. This distinction has become the place where most have drawn the red line. (Gouw 2018, 500)

In short, enhancement is therapy plus.

With enhancement in mind, could we alter the genomes of our children to improve their level of intelligence or athletic skill or musical talent to a level above what is normal? What if wildcat clinics spring up to sell these genetic services? Families with larger incomes will be the first customers. Over time the genetically enhanced children will comprise a distinct socioeconomic class, the genrich. Those unable to afford genetic services will slip into the genpoor class (Gouw 2018, 503). "Except in Lake Wobegon, not every child can be above average" (Sandel 2004, 3). The prospect of enhancement raises the specter of inequality.

Now, a smart bioethicist could simply give a stamp of approval to therapy while rejecting enhancement, right? Not quite. Why? For two reasons. First, the line between therapy and enhancement is not easy to draw. It is blurry. Are dental implants therapy or enhancement? Are performance-enhancing drugs therapy or enhancement? (Peters et al. 2008). If legislation would approve therapy but disapprove of enhancement, some clinicians would simply redefine enhancement as therapy in order to make the sale.

Second, there is no accepted definition of normality. So, increasing intelligence or talent could not be measured as surpassing what is normal.

To make matters worse, once gene editing becomes widespread, the norm will change. "There are difficulties owing to the fact that both *enhancement* and *therapy* are bound up with, and absolutely dependent on, the inherently complicated idea of health and the always-controversial idea of normality. . . . For these reasons, among others, relying on the distinction between therapy and enhancement to do the work of moral judgment will not succeed" (President's Council on Bioethics 2003).

This leads genetics researcher Arvin Gouw to walk with the therapy-enhancement distinction but avoid slipping on the banana peel of normalcy.

> I believe the therapy versus enhancement recommendation can still be endorsed for genome engineering, but it should not lead us to a hunt in discovering the static standard norm, but rather because the standard is a moving target and the improved norm is better attained from therapy than from enhancement. Enhancement will improve the normal well-being at the cost of increasing the gap between the impoverished and the new norm. (Gouw 2018, 503)

Therapy yes. Enhancement, maybe not.

More thought needs to be given to this topic, a topic already discussed now for three decades within the context of genetics. "Ultimately the ethics of enhancement are intertwined with the views of fairness," observes Ellen Wright Clayton writing in *Nature*. "Concerns about equity should lead society to develop guidelines for gene therapy to avoid a nightmare future in which a group of privileged people becomes stronger, smarter and more beautiful than the rest. But because drawing lines between treatment and enhancement is difficult, the more likely and more unsettling scenario is that physicians will be left to rely on their own ethical commitments to decide when to use gene therapy" (Clayton 2018, 59).

CRISPR's Yellow Flashing Traffic Light

In short, here is the problem. Scientists around the globe are joyously playing with their new toy, CRISPR/Cas9 technology. Much is being learned at this stage of research. Yet, the large number of unknown consequences of gene editing pricks their consciences. It is too early to declare what is safe and what is dangerous. So, a generally agreed upon policy has developed: refrain from human clinical trials and, by all means, avoid altering the human germ line. Yet, this tacit global agreement among geneticists has not prevented one Chinese scientist from taking an unapproved risk.

This has given rise to a sense of moral urgency within the global scientific community. A team of three spokespersons—Victor Dzau, President of the U.S. National Academy of Medicine; Macia McNutt, President of the U.S. National Academy of Sciences; and Chunli Bai, President of the Chinese

Academy of Sciences—have issued a joint call for ethical standards. "To maintain the public's trust that some day genome editing will be able to treat or prevent diseases, the research community needs to take steps now to demonstrate that this new tool [CRISPR] can be applied with competence, integrity, and benevolence" (Dzau et al. 2018, 1215).

A Single Planetary Community of Moral Deliberation

Free market eugenics is something to be feared. In Chapter 1 of the eugenics story, it was the totalitarian Nazi government that wreaked the horror of genocide on the world. The next chapter is not likely to involve governmental tyranny. More likely is the market where gene editing will go on sale for those who can pay. Genetic products will likely become increasingly exotic, fashionable, and enticing. The market chaos may turn children into commodities, and this may risk a loss of dignity. Here is my motto: *God loves each of us regardless of our genetic make-up, and we should do likewise*.

More than the dignity of each individual child is at stake here. So, also is the future evolution of *Homo sapiens.* Free market eugenics has the potential for altering the biological future of the human race. Denis Alexander offers some theological wisdom to give us pause. "Humankind's value lies not in some list of intrinsic qualities, but in God's grace, in his bestowal of a kingly, priestly, status that we certainly do not deserve. And that status is bestowed on the whole of humankind as a community," not merely individuals (Alexander 2017, 290). The future of our species within divine grace sets the context within which CRISPR technology becomes an issue warranting responsible deliberation.

The setting of public policy for a matter this large and this serious should not be sequestered within the scientific community alone. Nor should it remain within one nation alone. Engaging in moral deliberation toward setting policy on the genetic future of the human race is, like ecology, a planetary concern. Bioethicists along with theologians and the wider public should be brought into this deliberation.

Anthropologist and veteran *Zygon: Journal of Religion and Science* contributor Solomon Katz reminds us that "science is not equipped to deal adequately with the values dimensions and political issues that accompany the challenges. For an adequate response, there must be cooperative effort by scientists and statespersons, informed for moral leadership by the religious wisdom that is available" (Katz 1999, 237). Even though it is rumored that religious people are responsible for division, rivalry, and violence in society, Katz looks to religious thinkers and leaders for the spirit of cooperation. Religion is "a catalyst to promote cooperation and facilitate the emergence of the new moral leadership in scientific, technological, and political spheres" (Katz 1999, 238).

Policing laws that governments might institute to restrict access to genetic services will not work without the support of public morality. What is needed to support conscientious scientists is a public spirit that embraces responsibility for the future, the well-being of the entire human race, and the common good. This is where our international and global community needs spiritual leadership. "Upon the shoulders of the spiritual leaders rests the responsibility for and the possibility of bringing about the conditions in which moral leadership can emerge" (Katz 1999, 253).

Conclusion

Looking ahead, CRISPR gene editing combined with other biotechnologies and medical research could lead to invaluable therapies and perhaps selected enhancements. The present moment calls upon our ethicists and spiritual leaders to project a vision of a future characterized by optimum human health, planetary flourishing, and universal participation in the common good (Peters 2015). If we begin with such a vision, then we can measure the potential contributions of CRISPR gene editing accordingly.

It appears to me that we have a yellow flashing traffic light. This signals caution. Our scientists should definitely proceed in their research on gene editing. But, they should proceed with caution. The future of the human race is at risk. As a theologian and bioethicist, I can only applaud those scientists who, like their bioethicist partners, are willing to proceed with conscientious caution.

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