

LITERATURE REVIEW

THREE VIEWS OF CRISPR

Ceccarelli, Leah. “CRISPR as Agent: A Metaphor That Rhetorically Inhibits the Prospects for Responsible Research.” *Life Sciences, Society and Policy, Vol 14, Iss 1, Pp 1-13 (2018)*, no. 1 (2018): 1. <https://doi.org/10.1186/s40504-018-0088-8>.

Ceccarelli conducted a systematic comparative language analysis on the literature related to a gene editing technology from the 1970s called recombinant DNA with recent news reports on CRISPR to show how public attitudes toward gene editing technology have changed over the last half century. She finds that metaphors in news reports present CRISPR as a biological entity with agency. After observing that many popular news writers seem content to resign themselves to the inevitable control CRISPR will have over the world, Ceccarelli writes “we are carried along by a linguistic and cognitive momentum that makes it less likely that we will orient toward this technology as a tool under the control of scientists and science regulators who make decisions about whether or not particular synthetic biology projects should be undertaken.” None of this language was present in the literature she reviewed on recombinant DNA.

She recognizes the moral complacency of the public through these metaphors and presents a convincing argument that such changes should raise concern; however, she does not provide a

strong analysis of the potential causes of this transition in public opinion. In the period between the two technologies she discusses, significant cultural changes—especially in the philosophy of technology—that encourage the passive acceptance of all technological advancements as inevitable have captured the moral imaginations of the informed public. Transhumanism has gained a lot of ground in bioethics over the last fifty years, and the preeminent French-German philosopher Bernard Stiegler published a multi-volume philosophy that traces the evolution of humans and their tools such that development of biology is inextricable from technology: what we shape shapes us in turn. These developments in the philosophy of technology have provided some people sufficient ground not to *fear* biotechnology and even to consider it *prima facie* good.

Despite these shortcomings in identifying causes for the change, the article is very interesting for its thorough analysis of two drastically different attitudes from two stages in gene editing technology that are sufficiently set apart in time to show just how much attitudes have changed in only two generations. Ceccarelli demonstrates convincingly that those who resist gene editing in the form of CRISPR face a greater challenge in their efforts to influence public opinion than their predecessors did. Moreover, her article mirrors back to the public a frightening moral turpitude

in *even asking* if certain technologies are potentially destructive enough to the earth and humanity that we might be compelled to interfere with their evolution.

Liao, S Matthew. “Designing Humans: A Human Rights Approach.” *Bioethics* 33, no. 1 (January 2019): 98–104. <https://doi.org/10.1111/bioe.12519>.

Early this year, NYU bioethicist Matthew Liao wrote a piece in response to the excitement around the birth of the CRISPR babies in China. His article provides a way to approach ethical decisions regarding how to modify genes in making so-called “designer babies.” Liao argues for a human rights approach as opposed to the libertarian approach (any modification is acceptable), the perfectionist approach (that one has a moral obligation to create the best possible life), and the life-worth-living approach (which employs utilitarian judgment of values in certain traits and may lead to euthanizing people with disabilities). He admits that more analyses are required if we are to be thorough in considering the best approach to designer babies.

Liao’s human rights approach requires that we grant two conditions: All human beings have equal value, and all humans are entitled to the fundamental capacities for a good life. The conditions for the good life include certain capacities, such as five senses, which are considered to be fundamental to humans. This leads him to argue that we must be concerned with the genetic makeup of a human insofar as these capacities are affected. He determines that we are obligated not to create or modify life in such a way that we remove or prevent natural human capacities. If we do

create designer babies, we are not permitted to design babies without the capacity to hear. Liao writes that we are permitted to accept life that does not have all of its natural capacities, such as those who are expected to be born blind. Similarly, he says such capacities cannot be removed from the already born who have experienced such capacities. In this way, he makes space for disability, but he only requires acceptance of disabilities in the already born. He does not go as far as the Catholic Church does, the latter insisting that such human life must be accepted as human life despite its lack of some fundamental capacities or the potential to develop them without assistance.

Liao’s boldest claim is that if we have the ability to create a capacity where there was none, it would be impermissible not to do so. That is, we have a moral obligation, insofar as we are able, to design or modify life such that all fundamental capacities are intact. This provides an interesting problem, though, which he addresses to some extent: How do we distinguish fundamental capacities from preferences, and what is the relationship between these capacities and genetics? This is where Liao gets a bit confused. He admits that traits such as maleness or whiteness may be preferred for social reasons—to live the “best” (or perhaps a “most comfortable” would be more accurate) life—but socially privileged race and sex are not fundamental capacities of humans. He then goes into conversation about taste, which is one of these capacities. He recognizes the power to taste as a fundamental human right, but such a right does not include the power to taste and appreciate fine wine.

What troubles me about this distinction is that he conflates aesthetic judgment with nature such that one could have a genetic

predisposition to appreciate fine things. He fails to recognize that genetics has nothing to do with the appreciation of fine wine. If anything, a genetic predisposition to hypersensitive powers of taste would ruin appreciation of the wines considered to be the greatest on earth (The Holy Grail of wine regions, Bordeaux, is valued for its highly structured wines, and “supertasters” dislike highly structured wines. They’d be more inclined to enjoy new world Syrah, regardless of price.) While taste is an important capacity to appreciate the earth’s richness, and I absolutely agree that we must protect this capacity if we can, the good life does not depend on a genetic predisposition even to have taste buds at all. We are adaptive creatures. We can find joy and sorrow in any experience, or so the great mystics and poets teach us. Aesthetic judgments are value judgments of experience, and how these judgments create in us an encounter with pleasure or awe or power or disgust. These are not genetic adaptations; they are social and spiritual processes of making a meaningful life out of whatever you were given—or whatever you have life left.

This failure to understand the relationship between aesthetics and genetics may also provide a key to understanding why Liao misses the importance of accepting the unborn life that may have a disability. Aesthetic judgments involve highly subjective value judgments on the surface of things, but, on a deeper level, we judge sensuous experience according to our ability to feel connected to God, to nature, and to other people. This is why sometimes a wine can taste finer when it is tasted in better company. I contend that it is our capacity for relationship that makes us human, not our ability to see or hear or taste the material world.

Scherz, Paul. “The Mechanism and Applications of CRISPR-Cas9.” *National Catholic Bioethics Quarterly* 17, no. 1 (2017): 29–36.

Paul Scherz, Ph.D., moral theologian and geneticist from The Catholic University of America, provides a helpful explanation of the CRISPR/Cas9 gene editing technology with a subsequent thorough analysis of various uses of the technology according to the integral parts of the moral act according to the Catholic tradition and church documents on germline gene editing. The moral reasoning is precise, unbiased, and careful. Scherz admits uses of CRISPR/Cas9 that effectively treat and prevent diseases for in vivo humans are morally good, but he expresses a great deal of concern around its practical use because it has thus far depended heavily on in vitro fertilization. Also, the actual effects of the alteration are sometimes unpredictable and may lead to unintended mutations.

After presenting proper functioning of the technology and its potential problems, Scherz outlines three ethical questions to consider as CRISPR/Cas9 develops. These are, “How much risk from off-target effects is acceptable in therapeutic uses?” How much power should humans exert over the next generation and, of course, how should technology engage human sexuality without reducing it or instrumentalizing it? An additional question to consider is how “gene drives crystallize new concerns about humans’ relationship with the environment.” The new technology exists within a delicate ecosystem that we know is

already suffering a great deal of change that profoundly affects vulnerable human life.

Scherz expresses a very cautious view toward advancement in use of CRISPR/Cas9 without vilifying it as an intrinsically evil technology that has no potential for good uses. As a highly trustworthy source on Catholic moral teaching and careful analyst of biotechnologies, Scherz's article is extremely helpful.

CONCLUDING OBSERVATIONS

While many writers want to pause the development of gene editing technologies to ask important questions, most accept that such a pause will not occur. Many ethicists are considering what these technologies actually do, what promises their developers make, and what new capacities for potential domination may occur. In light of those considerations, ethicists must be extra vigilant in returning to the question of what is essentially human. Guidance is helpful, and our religious traditions continue to provide some resources for answering these questions. The greatest risk in these conversations is forgetting that genetics only accounts for so much. Although modified genes could enter into the germline and change nature, we are not yet at great risk of this. For all we know, gene-edited humans could be sterile. Perhaps we should view the fury around this technology as a sign that maybe we haven't become complacent. If genetic editing is the looming change it seems to be, let us ask how it can be used to protect people from actual molecular threats while also respecting the boundaries we, as a society and as a people of God, have placed around human life, which is a good. Let us also ask if its costs outweigh the benefits of methods which may be more

effective in addressing environmental factors in well-being.

Andrea Thornton is a Ph.D. student in theology and health care ethics at the Albert Gnagei Center for Health Care Ethics at Saint Louis University. She is also a Board Certified Chaplain

