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TOWARD A STRONGER JEWISH FRAMEWORK OF ELECTIVE GENETIC MODIFICATION

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ABSTRACT

Genetic modification is an emerging field that seems poised to expand beyond medical applications to elective modifications. Jewish ethicists and legal scholars will need an appropriate Jewish syllogism to an existing area of Jewish law in order to address questions raised by this technology. I propose using the well-developed Jewish framework around cosmetic surgery and elective procedures to tackle issues of elective genetic modification. This syllogism is informed by the psychological work around cosmetic surgery and suggests several motivations found in those who seek out modifications. Each motivation is the basis for a hypothetical use of elective genetic modification, which then is explored through the Jewish framework derived from cosmetic surgery. This proposal is one way to help Jews address early uses of elective genetic modification until the field of genetic modification develops further.

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INTRODUCTION

In 2015, a group of engineers at Google spoke to the head of the translation department with an unusual proposition: to replace the entire translation program, Google's most reliable and popular program with half a billion users every month, with an artificial intelligence based on machine learning. When the project went live a year later, its results were astonishing—translation in multiple languages at a level approaching the work of a professional human translator.[1] This first public use of machine learning set off a revolution. Six years later, OpenAI released chatGPT, a program based upon machine learning that can converse and generate text intelligently. It was the first clear instance of a machine capable of passing the Turing test, the gold standard of artificial intelligence.

The rapid deployment and changes that have surrounded this technology match the thesis of the philosopher Thomas Kuhn. In his work, *The Structure of Scientific Revolutions*, Kuhn posits that scientific progress does not occur in a linear and continuous fashion, but rather through a series of "paradigm shifts," sudden and radical changes in scientific thinking that overturn a shared set of assumptions, beliefs, and methods.[2]

At this moment the groundwork is being laid for a new shift in the field of genetics. Part of this stems from an increased ability to sequence, or read, genes. It

[1] Conor Dougherty, "Google Translate App Gets an Upgrade," *The New York Times*, January 14, 2015, https://archive.nytimes.com/bits.blogs.nytimes.com/2015/01/14/google-translate-app-gets-an-upgrade/?searchResultPosition=1
[2] Kuhn, Thomas S.. *The Structure of Scientific Revolutions: 50th Anniversary Edition.* United Kingdom: University of Chicago Press, 2012.

took 13 years for the Human Genome Project to sequence the entire genome, a project which culminated in 2003. This ability has grown exponentially. In February 2022, a laboratory sequenced the entire human genome in just five hours and two minutes.[3]

This ability to read the human genome has in turn enabled our ability to edit what we can now read. Though genetic editing has been a subject of speculation in science and science fiction for decades, researchers have been constrained by an inability to target specific genetic sequences with high fidelity and the inability to edit well at those places. In the early 2000's, synthetic proteins called zinc finger nucleases began to address both of these problems, and the invention of TALEN (transcription activator-like effector nucleases) took the field further. However, in 2012 researchers discovered the uses of CRISPR-Cas9, a protein complex that can identify and edit DNA with extremely high fidelity and do so at a fraction of the time and effort of any previous method.[4]

Heavy investment in research into genetic tools, ease of sequencing, vastly increased processing power, and the realization of multiple economies of scale have all combined to create exponential growth in the field. Genetic editing today is becoming inexpensive and widely accessible, and trends suggest that ease,

[3] Kevin Doxsen. "Record-breaking rapid DNA sequencing." ASBMB Today. American Society for Biochemistry and Molecular Biology. February 27, 2022. https://www.asbmb.org/asbmb-today/science/022722/record-breaking-rapid-dna-sequencing
[4] Gostimskaya I. *CRISPR-Cas9: A History of Its Discovery and Ethical Considerations of Its Use in Genome Editing.* Biochemistry (Mosc). 2022 Aug;87(8):777-788.

affordability, and access will combine to change the field entirely.[5] The ecosystem of genetic work is close to or at a tipping point, where I believe CRISPR-Cas9 will shift from being a tool of research to serving as a platform for an entire field of genetic editing.

The implications of gene editing, specifically the possibilities afforded by CRISPR-Cas9, are daunting. This is because it involves editing the fundamental code of life. Many of gene editing's potential uses are mired in controversy and concern over the possibility of people acting without full understanding of the implications of the edits they make.[6] Most of the immediate focus in the work of genetic editing is on two prospects: to edit human embryos or to deliver DNA to adults for gene therapy, both of which seem to be imminent possibilities. While both of these possibilities will first be employed for life-saving potential, they are not far removed from more ethically complicated applications that do not focus on saving lives.

Jewish perspectives on gene editing have until this point been primarily based on *halakhic* discussion around either the prohibition or the life-saving potential of these technologies. Applications beyond these carry a greater deal of ambiguity, due to the uncertainty in risk and benefits.[7] In most cases, the secondary effects of modification in many locations are poorly understood (even while the primary effects

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[5] ibid.
[6] Kiran Musunuru. "We need to know what happened to CRISPR twins Lulu and Nana." MIT Technology Review, December 3, 2019. https://www.technologyreview.com/2019/12/03/65024/crispr-baby-twins-lulu-and-nana-what-happened/
[7] Loike JD, Flaum RT. *CRISPR Technology: A Jewish Legal Perspective.* Rambam Maimonides Med J. 2022 Oct 27;13(4)

are growing clearer). Once issues of safety have been addressed, questions of modifying physical and behavioral features beyond normative health raise a host of difficult ethical problems. Furthermore, Jewish perspectives on gene editing have been complicated by recent changes in ease, affordability, and access. Though currently most questions around the ethics and morality of gene editing are considered by a relatively narrow set of experts, greater affordability and access might introduce these powerful tools to the wider society in a manner analogous to the deployment of artificial intelligence and machine learning. All of these priorities and considerations must be taken into account when formulating Jewish ethical and legal guidelines for elective gene modification.

This paper is centered around a Jewish approach and guidelines for this kind of elective genetic intervention. A *posek*, an interpreter of Jewish law, seeking to deal with the nuances of real life issues from a Jewish perspective must ideally mentally scan the entire corpus of Jewish text to find an appropriate syllogism.[8] Accordingly, the primary difficulty in dealing with such situations is finding a sufficiently comparable precedent or analogy within Jewish text and law—an enormous challenge in this case, when dealing with a technology that has so many unprecedented techniques and implications. Future *poskim* dealing with this material will be forced to evaluate many analogies, and propose differing solutions, before moving toward a consensus opinion on how to approach elective genetic modification.

[8] David J. Bleich. "Methodology of Psak." *Tradition: A Journal of Orthodox Jewish Thought* 51, no. 2 (2019): 7–41. https://www.jstor.org/stable/26879531

Additionally, any attempt to tackle these questions, including my own proposal, will rest upon several assumptions. First, that uses of this technology are both possible and available, conditions that seem highly likely at the moment but are (as of yet) not fulfilled. Secondly, that this technology is safe and that questions around the danger of its use are resolved. Many of these questions around safety will be addressed in medical cases that involve the principle of *v'rapoh yirapeh*, the duty to heal that the rabbis derived from the text of Exodus 21:19. In these straightforward cases of healing, almost all the concerns over the safety of genetic modification are negated in the face of a greater risk to health. Only with the information around issues of safety from prior precedents (specifically, data about the downstream secondary effects of genetic editing) can the questions around elective genetic modification be addressed. Lastly, in order to tackle this question the assumption must be made that these questions take place within a rather early stage of genetic modification.[9] Later stages of genetic modification and technological improvement involve so much uncertainty and changes so profound that attempts to address them begin to resemble science fiction.[10]

This paper is an effort to gain purchase, Jewishly, on the issues surrounding elective genetic modification via syllogism, and use that in turn to elucidate those issues, offer insight into the mind of those who may seek it out, and firmly ground a

[9] Jamie Metzl. Hacking Darwin: Genetic Engineering and the Future of Humanity. United States: Sourcebooks, 2019.
[10] Though that has not stopped speculation, sometimes quite rigorous, of the topics involved around genetics and futurism. For an example, see https://gwern.net/amuse

response in Jewish tradition. In the literature review, I cover some of more innovative approaches, as well as the discussion around the issues that still need to be resolved, before moving forward to my own research and proposed syllogism as a framework for future Jewish ethics and legal work on this subject. I use that framework and the psychological research around it to examine the motivations that lead people to pursue elective genetic modification, then apply the framework to a series of hypothetical scenarios of early probable examples, each intended to bring up different variables to consider.

LITERATURE REVIEW

Shimon Glick, an American physician who now works in medical ethics in Israel, discusses some of these issues in his essay, *Some Jewish Thoughts on Genetic Enhancement*.[11] In it, he points out the incredible difficulties of differentiating clearly between therapy and enhancement and mentions "relying on the distinction between therapy and enhancement to do the work of moral judgment will not succeed." Each case, he says, must be evaluated on its own merits. He goes further to point out that a partnership with nature and the continued development of creation are deeply Jewish values, though not in their own right. To this he adds the Jewish obligation of *gemilut hesed*, to help others make their lives more pleasant and reduce suffering. He states further:

> *In the hierarchy of good deeds, the highest is hesed shel emet, an act of true loving kindness, which the rabbis maintain is done by attending a funeral and preparing the body for burial, for there is no chance for the dead person to repay the favor. I might suggest that in a similar vein, making an effort to help future generations might be called hesed shel emet, since, in general, they cannot repay the individual who brought about the improvement in their lives…. Thus, while again it is hard to find a specific mandate to enhance the opportunities of generations to come beyond one's children, it would seem that such an action would be praiseworthy.*

[11] Shimon M Glick, "Some Jewish thoughts on genetic enhancement," *Journal of Medical Ethics* 37 (2011), 415-419.

Dr. Glick also takes care to address the notion of *amal*, the value of struggle and effort in study. He feels quite strongly that maximizing the potential of future generations merely sets the standard higher, rather than negating the effort they might put in. He concludes his work by saying every "application of genetics should be evaluated on its own merits—its goals, dangers, and consequences."

While his paper is careful to negate any notion of a categorical ban on elective genetic modification, it does not offer anything more than a few suggestions on how to evaluate those merits. Furthermore, evaluating each application of genetics might be feasible on a small, immediate scale, but beyond individual cases, rabbis and Jewish ethicists will need a heuristic with which to approach the material.

Ronald Green, a Jewish professor of ethics at Dartmouth College, tackles some of these issues as well in his essay "*Curing Disease and Enhancing Traits*."[12] In it, he argues that clear distinctions of malady, disease, health, and genetic enhancement will help clarify future work. He limits his support for elective genetic enhancement to genetic modifications that are preventative or improve our condition; and to genetic modifications that provide a benefit to a person without risk. He also notes that enhancements that merely provide a competitive edge over other humans might prove problematic. Unfortunately, he does not make clear what the definition of a benefit might be, leaving the door open to any modification without risk.

[12] Ronald M. Green, "Curing Disease and Enhancing Traits: A Philosophical (and Jewish) Perspective," in *Jews and Genes: The Genetic Future in Contemporary Jewish Thought*, ed. Elliot N. Dorff and Laurie Zoloth (University of Nebraska Press: 2015), 257-273.

John Loike and Tzvi Flaum, in their article *CRISPR Technology: A Jewish Legal Perspective,*[13] published while this thesis was being written, write that the ability to easily edit genes raises three issues: the blurred lines between what is and is not medicine, the notion of 'playing God,' and issues surrounding *kilayim*, the forbidden mixing of species from Leviticus 19:19. They continue to elaborate on many potential issues across a wide variety of topics that may arise from genetic engineering, but offer only a few suggestions on addressing them. They point out that mitochondrial replacement therapy has been permitted by almost every rabbi[14] (but do not address the potential for its use in enhancement), that using CRISPR for enhancement of the human condition may be analogous to the halacha of cosmetic surgery and therefore permitted, (but do not explain how this syllogism may be used, a topic I discuss below), and the issue of designer babies, which they explain as forbidden (though they do not explain why this issue is a separate one from their discussion of enhancing the human condition above). They also mention the issues of increasing lifespan (which they do not resolve) and xeno-transplantation. In their discussion of this last issue, Loike and Flaum cite the Jewish prohibition against magic by Rabbi Menachem ben Solomon (HaMeiri) in his 14th century commentary on the Talmud *Bavli*, *Sanhedrin*:67–68, where HaMeiri writes (translation theirs):

[13] Loike, October 2022
[14] The most thorough discussion of this issue I know of comes from a letter that the *Eretz Hemdah* wrote me in response to my request for their take on issues of mitochondrial replacement therapy (though see also Rabbi Tendler's earlier 2015 article about the considerations around being part of a clinical trial for this technology). I can email a copy to anyone who would like to request a copy from michaelgwalden@gmail.com.

> *whatever is achieved through natural means does not constitute "kishuf" [sorcery]. Anything which is done via a natural [biological] act is not included in sorcery. Even if they know how to create beautiful creatures without sexual reproduction—as is known in the books of nature that this is not impossible—it is permitted to do, because anything which is natural is not included in sorcery. And similar to this, [anything] which is medicinal is not [a problem].*

Though Loike and Flaum only apply this to issues of innovative reproductive technology, it may also be interpreted as a wider permission of future use of elective genetic modification.

Aaron L. Mackler, a Conservative rabbi and medical ethicist, writes in his essay *"Genetic Enhancement and the Image of God"* that the framework with which to approach enhancement is through evaluating each potential case as supportive or counter to the notion of the image of God, or *b'tzelem Elohim*.[15] He notes that, "appreciation of the value of human persons as created in the image of God grounds a general commitment of respect for persons." As he writes, he reviews some of the biblical commentators and their understandings of the phrase *b'tzelem Elohim*, the phrase in Genesis for "image of God." For example, he points out that Maimonides understands the human intellect as constituting the divine image, while Rashi understands it as the ability to understand. Nachmanides defines it as a spiritual soul

[15] Aaron L. Mackler, "Genetic Enhancement and the Image of God," in *Jews and Genes: The Genetic Future in Contemporary Jewish Thought*, ed. Elliot N. Dorff and Laurie Zoloth (University of Nebraska Press: 2015), 274-284.

which is immaterial and immortal, and Abraham Joshua Heschel discusses a concern for others as an essential characteristic of humanity shared with God. None of these, he notes, deal with a physical form or body, though he notes as well the deep Jewish respect for the body.

This translates directly into what is permissible and elective genetic modification. He writes that anything that might interfere with the characteristics most associated with the image of God (such as intellect, comprehension, free will, and transitive concern for others), needs to be evaluated extremely carefully or even proscribed, above and beyond the normal concern and honor we might have for the treatment of bodies.

Though Rabbi Mackler's framework is elegant, its implementation would appear to be extremely difficult and unclear. Does modification that increases someone's intellect make them even more in God's image, or less so? More pressingly, we are still without guidance for the more likely and extensive modification of the body itself, other than respect for it.

Louis Newman, a professor of Jewish studies at Carleton College, proposes his own framework in *"'Blessed is the one who is good and brings forth goodness': A Jewish Theological Response to the Ethical Challenges of New Genetic Technologies."*[16] He begins by saying that a Jewish response to these issues cannot come from *halakha*, as

[16] Louis E. Newman, "'Blessed Is the One Who Is Good and Who Brings Forth Goodness': A Jewish Theological Response to the Ethical Challenges of New Genetic Technologies," in *Jews and Genes: The Genetic Future in Contemporary Jewish Thought*, edited by Elliot N. Dorff and Laurie Zoloth, (University of Nebraska Press: 2015), 285–309.

he believes that no classic source will be analogous, even remotely, on issues of genetics. Without a precedent, the only *halakhic* way forward would be to work from an intuitive knowledge of tradition rather than deductively from previous cases. However, he believes that with no good alternatives the most powerful approach Jewishly would be to work midrashically, using classic texts not as precedents for action but as sources for values and perspective.

Dr. Newman immediately identifies twin issues - the problem of powerful knowledge itself, which he concludes can only be taught to worthy people, and the power to alter one's genome, which needs a guiding function but he concludes is not forbidden. He states that Judaism already provides a guiding function, namely Godliness. Newman points out that the Torah proclaims that the purpose of Israel is to fulfill God's commandments in order to bring the world closer to God and the culmination of history, when "God will be one and God's name will be one." He goes further to point out the verse from Micah 6:8, "Oh Man, what does the Lord require of you? Only to do justice, love mercy, and walk humbly with your God."

This purpose of a righteous life, Newman proclaims, must be the metric by which all genetic modification is evaluated. In this case, a Jewish approach to genetic editing is concerned primarily with whether or not such an edit will facilitate living a holy life, which he seems to define as an increase in benevolence in this world. He gives the example of condoning, perhaps even requiring, modification of a gene linked to violent behavior, even though that genetic modification might be a core change to personality. All work in genetics he states, from a Jewish point of view,

must be oriented toward the idea expressed in the blessing, “Blessed are You, Lord our God, who is good and brings forth goodness.”

Dr. Newman’s article laudably contains a clear metric by which to evaluate future genetic edits. The examples he gives show willingness to extend the metric quite far into the potential implications of genetic editing, though it might contradict ideas of Western liberalism. However, the dictum, “where one finds two Jews they find three opinions,” might hint at future difficulties over clarifying when an edit will or will not lead to a more benevolent future.

Additionally, Dr. Newman claims that there is almost no *halakhic* precedent worth using when dealing with the issues surrounding genetic modification. This statement ignores several precedents that might be able to handle a Jewish framework around elective genetic modification in the early stages. Later genetic modification, with the capabilities and societal implications that he seems to be discussing, may need to jettison these early frameworks in order to fully grapple with the power of genetic modification.

Jeffrey Burack, a Jewish physician, seems to support the ideas of Louis Newman, with a value-neutral view of the technology itself, and instead has deep concerns over what constitutes appropriate usage of genetic modification beyond the medical. In “*Jewish Reflections on Genetic Enhancement,”* like Newman, he avoids a

framework from Jewish law, and instead he provides a list of guiding values that might inform decisions.[17]

- Co-creation with God, and a rejection of naturalism. Any edit need not be rejected on the basis of what is more or less natural.
- Stewardship, rather than ownership, of each of our bodies. Because of this, the weighing of a genetic edit may not always give priority to the individual's wishes. Additionally, one must look at risk regardless of the individual's wishes.
- Seeking holiness. While a secular perspective might focus on treatment versus enhancement, a Jewish perspective might ask if the goals and outcomes promote a holy outcome (once again defined by the text of Micah 6:8).
- The Image of God. An edit should aim toward the image of God (and the numerous Jewish definitions of the phrase), while respecting and even promoting the diversity of human appearances.
- Concern for the weak and disenfranchised. Though editing should not be rejected on the basis of distribution, genetic editing ought to be available to many. In a similar vein, Dr. Burack rejects genetic edits that change aspects of humanity that merely give an individual a

[17] Jeffrey Burack, "Jewish Reflections on Genetic Enhancement," in *Jews and Genes: The Genetic Future in Contemporary Jewish Thought*, edited by Elliot N. Dorff and Laurie Zoloth (University of Nebraska Press: 2015), 310-341.

competitive advantage over another individual, rather than those such as thoughtfulness, honesty, compassion, and orientation to justice.

- Humility. Humility is described as "at once both a *halakhic* prescription…and an anthropological description of the religious personality." As such, humility should set the limits on how humans should consider improving themselves.
- A rejection of self-fulfillment. Edits should not be driven by an endless internal desire toward perfection.
- Duty. Genetic edits chosen from a perspective of orientation toward fulfilling obligations are preferred.
- Responsibility to future generations. Judaism is collectivist not merely across communities but across generations, and what world will be passed down. Genetic edits can work quite strongly for this, or against this.

Dr. Burack's article, like Dr. Newman's, simultaneously limits many future applications of genetic editing, while at the same time promoting or even mandating work and genetic editing that matches a strict Jewish ideal. In the future, this perspective may be sorely needed. However, for the immediate questions likely to appear with earlier genetic editing, much of their work will not be considered, and the questions and values raised by their work will seem ancillary or irrelevant until genetic editing abilities reach a certain threshold. Precedents will likely be set long before these larger ethical questions are asked by society.

Finally, **Robert Gibbs,** a professor of Judaism and philosophy at University of Toronto, conceptualizes a unique approach to genetic editing in "*Mending the Code*."[18] In the essay, he attempts to delineate the acceptable use of genetic modification by analogizing it to the repair of a Torah scroll, another code that governs life and is meticulously copied. While his framework of genetic modification permits editing, it only allows it up until a presupposed norm, though what that norm is in humans is unclear. Dr. Gibbs, by use of this syllogism, inherently rejects any enhancement of a person via genetic modification, no matter the reason. While the metaphor is beautiful, it reads slightly like the naturalist perspective that other authors noted was not a value in Judaism, which instead seems to support an approach of co-creation.

[18] Robert Gibbs, "Mending the Code," in *Jews and Genes: The Genetic Future in Contemporary Jewish Thought*, edited by Elliot N. Dorff and Laurie Zoloth (University of Nebraska Press: 2015), 342-374.

THE HALAKHA OF ELECTIVE PROCEDURES AS A SYLLOGISM FOR JEWISH UNDERSTANDING OF ELECTIVE GENETIC MODIFICATION

I have reviewed various proposals that attempt to tackle some of the modern issues of gene modification beyond medical or therapeutic use. Going forward, however, I would like to suggest that the Jewish response to future elective gene modification, especially in the initial stages, is best conceptualized as analogous to current elective or cosmetic procedures. Two sources can aid us in tackling this analogy. First, studies around the psychology of those who seek out elective enhancement through cosmetic procedures can lend insight into who will be inclined to seek out genetic change for themselves or their progeny. Second, the well-developed body of responsa around these issues of cosmetic enhancement tackle (by different means) many of the issues that may be raised by early, simpler potential situations of gene modification for non-medical use. For the purposes of this paper, I may abbreviate the term elective genetic modification to EGM.

With the bodies of responsa and psychological research that come from this analogy to cosmetic enhancement, I identify and categorize the major motivations of those who might seek EGM. I will subsequently offer a Jewish framework for dealing with each possible motivation and provide demonstrations through simple, plausible scenarios. This analogy has limitations: EGM pushes the boundaries of what may be considered traditional medicine, and could be considered not to be medicine at all.[19]

[19] As it does not focus on diagnosing, preventing, or curing malady, nor alleviate pain.

Additionally, EGM and cosmetic procedures use different methodologies. Finally, the scale and scope of potential outcomes of EGM are far beyond cosmetic procedures, which presently push the limit of what they can affect in the human form. (especially with germ-line, or inheritable, modification). Finally, individual cases will present often with unclear motivations, multiple motivations, and even competing motivations that will need to be addressed in each particular case—just as there would be in cosmetic surgery.

THE PSYCHOLOGY OF THOSE WHO SEEK COSMETIC ENHANCEMENT

In 2010, plastic surgeons held a conference in Colorado to discuss the wider medical trend of outcome-based (often called evidence-based) medicine, and how that trend would change their field.[20] In the time since, there has been a massive focus on evidence-based elective procedures, and a huge increase in data collection surrounding not just the procedures themselves but the patients who seek it. This quantity new data has enabled psychologists such as Dr. Viren Swami at Anglia Ruskin University and Dr. David Sarwer at Temple University to examine the motivations surrounding the decision to undergo such procedures, to define successful outcomes, and to examine how the psychological state of those opting for these procedures affects the odds of a successful outcome.[21]

Their work has done a great deal to tackle some of the myths and narratives surrounding elective surgery. In the 1950s and 60s, early plastic surgeons worked in tandem with psychiatrists to characterize patients prior to their procedures. These studies described large numbers of patients as suffering from a significant psychopathology, with disorders, such as depression, narcissistic personality disorder, and even schizophrenia. Earlier reports also contained elaborate interpretations of the role of conflicts within the unconscious and poor parental relationships as shaping decisions to seek surgery. In a 1998 paper, Dr. Sarwer demonstrated that

[20] Rod J. Rohrich & F. F. Eaves. "So You Want to Be an Evidence-Based Plastic Surgeon? A Lifelong Journey." *Plastic and Reconstructive Surgery*, 127 no. 1 (2011), 467–472. doi:10.1097/prs.0b013e318203a2dd

[21] David B. Sarwer, & J. C. Spitzer, "Cosmetic Surgical and Minimally Invasive Treatments," *Encyclopedia of Mental Health* (2016), 362–367. doi:10.1016/b978-0-12-397045-9.00057-4

there is no evidence suggesting these interpretations are valid or useful in determining patient appropriateness for surgery.[22]

In fact, modern research using contemporary and methodologically rigorous studies rebuts early clinical reports. These studies have identified little difference between individuals who seek cosmetic treatment and the general populace. Counter to the narratives around cosmetic procedures that still persist in society, the average person seeking such a treatment is, well, an average person. New social psychological research on the role of physical appearance in life suggests that for many people this can be considered a rational choice: thorough research indicates that people who present as more physically attractive are ascribed many diverse positive personality traits, more generous interpretation of their actions, and receive preferential treatment across a wide variety of social situations throughout their life.[23] As such, researchers suggest that cosmetic procedures and minimally invasive treatments can be understood as part of a wider group of self-enhancement strategies, such as regular exercise and monitoring for healthy nutrition.

Predictably then a large number of studies suggest that 80 to 90% of patients are satisfied with the results of cosmetic treatment. They report significant improvements in body image. A recent large independent study followed patients who had undergone elective procedures for five years after their surgery, and found

[22] David B. Sarwer, Thomas A, Wadden, Michael J. Pertschuk, and Linton A. Whitaker. "The Psychology of Cosmetic Surgery: A Review and Reconceptualization," *Clinical Psychology Review*, 18, no. 1 (January 1998), 1-22.
[23] M. M. Jaeger. "'A Thing of Beauty is a Joy Forever'? Returns to Physical Attractiveness over the Life Course." *Social Forces* 89, no. 3 (2011), 983–1003. doi:10.1093/sf/89.3.983

that for the vast majority (90 percent or more) of patients, the results of their surgery were as expected or better and they would choose the procedure again if faced with the same situation.[24]

One strong exception to these results are individuals motivated to seek cosmetic treatment by body dysmorphic disorder, or BDD. As defined by the American Psychological Association, BDD is a preoccupation with a slight or imagined defect in appearance that leads to substantial distress or impairment in social, occupational, or other areas of functioning.[25] Individuals with BDD are disproportionately found among people who seek cosmetic procedures (5-15%, as opposed to 1-2% of the general population). Unlike most patients however, those with BDD rarely are satisfied with the outcome of cosmetic procedures, with more than 90% reporting their procedure had no effect or worsened their symptoms of BDD.[26] A second, smaller exception to widespread patient satisfaction suggests that the presence of postoperative complications lessens (but does not erase) patient satisfaction.[27]

In analogizing these elective procedures to EGM, it is important to dispel any stigma or misconception about individuals who undergo such procedures and look at

[24] T. von Soest, I. L. Kvalem, K. C. Skolleborg, and H. E. Roald. "Psychosocial changes after cosmetic surgery: a 5-year follow-up study." *Plastic Reconstruction Surgery* 128, no. 3, (September 2011), 765-772. doi: 10.1097/PRS.0b013e31822213f0. PMID: 21866003.
[25] A. S. Hartmann, A. J. Blashill, J. L. Greenberg, & S. Wilhelm. "Body dysmorphic disorder," in *Obsessive-compulsive disorder and its spectrum: A life-span approach,* ed. E. A. Storch & D. McKay (American Psychological Association: 2014), 141–162. https://doi.org/10.1037/14323-008
[26] David B. Sarwer, "Body image, cosmetic surgery, and minimally invasive treatments." *Body Image* (2019). doi:10.1016/j.bodyim.2019.01.009
[27] David B. Sarwer, & Spitzer, J. C. "Cosmetic Surgical and Minimally Invasive Treatments." *Encyclopedia of Mental Health* (2016), 362–367. doi:10.1016/b978-0-12-397045-9.00057-4

an accurate picture. An increased focus on outcomes, education, safer techniques, and decrease in American smoking habits[28] has radically changed the risk profile in the past several decades.[29] While any surgery entails a degree of risk, public perception has not caught up.

The research-based guidelines for success of the American Society of Plastic Surgeons for plastic surgery procedures performed on teenagers may actually be relevant in all cases of elective procedure: the patient initiates the request, the patient has realistic goals, and the patient has sufficient maturity.[30]

Motivations for seeking cosmetic procedures vary drastically. Broadly, the motivations are labeled by researchers as internal (such as improving self-confidence), or external (such as seeking to find a romantic partner) by researchers. In general, those with internal motivations are likely to have their post-operative expectations met. However, most patients present with a variety of internal and external motivations.[31]

In looking at the literature, I have broken these two wider categories into five categories of motivations for those seeking elective enhancement. These motivations are present in the field of elective enhancement today, though the boundaries

[28] Nicotine reduces blood flow to surface tissue and causes other systemic effects that dramatically raise the odds of complications after surgery. From the World Health Organization.
[29] Rod J. Rohrich, I. L. Savetsky, Y. J. Avashia. "Assessing Cosmetic Surgery Safety: The Evolving Data." *Plastic Reconstruction Surgery Global Open* 13, no. 8(5) (May 2020). doi: 10.1097/GOX.0000000000002643.
[30] "Briefing Paper: Plastic Surgery for Teenagers," *Connect by American Society of Plastic Surgeons*, https://www.plasticsurgery.org/news/briefing-papers/briefing-paper-plastic-surgery-for-teenagers
[31] Sarwer et al., "Cosmetic Surgical and Minimally Invasive Treatments."

between them are frequently blurred. They become extremely important in future discussions of EGM:

1. External: those motivated primarily by practicalities. Examples today might include the older adult who seeks out rejuvenating procedures hoping to be a more attractive candidate in the job market, or the woman in the service industry who opts for breast enhancement to increase her earnings.
2. External: those motivated to keep up with what is considered normal. Examples might include the parents of a child with idiopathic short stature who seek out treatment with growth hormone, or surgeries to fix partial cleft lip.
3. Internal: those motivated to change for various personal concerns. Examples today might include the person who seeks to change some aspect of their physical appearance in order to boost their confidence, or to sexually enrich a partnership.
4. Internal: those motivated to change in order to have a relative advantage over others. While less evident than EGM might be with the limited options available in cosmetic procedures, an example today might include the narcissist who seeks to appear better than other people, or the person who uses Lasik eye surgery to get 20/10 vision, only in order to outperform others in sports.

5. Body dysmorphic disorder: those motivated to change based on a psychological preoccupation with a smaller imagined defect in appearance.

Psychological research offers a clear look at elective procedures and the psychosocial and economic motives for undergoing them. Currently, the options for enhancement are mostly limited to the field of elective surgery, but as gene modification technology develops it seems likely that people will turn to it with the same mentalities and motivations as they hold today. The same research indicates that on the whole, these people are not wrong to do so: generally they become happier and more confident versions of themselves.

PLAUSIBLE SCENARIOS OF EARLY GENE MODIFICATION

Using the categories of motivation taken from the field of cosmetic surgery, I have constructed five scenarios of ethical quandaries in potential EGM based upon those motivations. Each scenario offers a variety of nuances that need to be addressed in addition to the core issue of the motivation for EGM. These issues are intended to represent early available opportunities for EGM, as each one is based upon current knowledge or research, and could conceivably be performed using an existing technology or with CRISPR-CAS9 gene therapy.

1. Aspiring parents from a family with a long history of developing osteoporosis hope to help their future child avoid that fate and increase overall their future child's quality of life. To do so, their geneticist plans to edit the DNA of a fertilized ovum in the area of the androgen receptor gene to give their child 12 CAG repeats. In most people, the typical androgen receptor gene has 10 to 32 repeats of the DNA sequence CAG; but the fewer repeats there are in the gene, the more responsive an androgen receptor is to being stimulated.[32] This increased activation of androgen receptors leads to an increased ability to build and maintain muscle mass over a lifespan—a key way of preventing osteoporosis that might naturally happen in later life, but

[32] R. L. Sheppard, E. E. Spangenburg, E. R. Chin, S. M. Roth. “Androgen receptor polyglutamine repeat length affects receptor activity and C2C12 cell development,” *Physiological Genomics* 43, no. 20 (October 20, 2011), 1135-43. doi: 10.1152/physiolgenomics.00049.2011.

also of giving a child an incredible increase in strength throughout their entire life relative to their peers.[33]

2. Parents with a young boy with poor emotional regulation approach a geneticist. Though they have long resisted any gene modification that their peers who are parents embraced, they are at their wits' end. They have learned that gene therapy that targets a gene, 5-HTTLPR, slightly lowers sensitivity to emotional information in the environment, with far fewer side effects than medication.[34] While they do not believe there is anything wrong with their child and consider him normal, they are watching with worry as he falls farther and farther behind his peers in school.
3. A woman whose passion is freediving, or unassisted diving merely by holding one's breath, is debating if she should participate in a clinical trial focused on myoglobin in humans. Myoglobin is a molecule capable of storing oxygen in cells, with a longer duration capability of and capacity for oxygen storage than the more commonly expressed hemoglobin. Though humans naturally have both molecules in their cells, whales and other diving mammals have much greater

[33] T. L. Nielsen, C. Hagen, K. Wraae, L. Bathum, R. Larsen, K. Brixen, M. Andersen. "The impact of the CAG repeat polymorphism of the androgen receptor gene on muscle and adipose tissues in 20-29-year-old Danish men: Odense Androgen Study." *European Journal of Endocrinology* 162, no. 4 (April 2010), 795-804. doi: 10.1530/EJE-09-0763.
[34] Christopher G. Beevers, Alissa J. Ellis, and Tony T. Wells, "Serotonin Transporter Gene Promoter Region Polymorphism and Selective Processing of Emotional Images," *Biological Psychology* 83, no. 3 (March 2010), 260-265.

concentrations of myoglobin, and they have a subtly different version of it that is much more stable.[35] The woman hopes to participate in a clinical trial with a gene therapy that modifies the human gene to the more stable form, then upregulates the expression of the gene to be almost twice as common. Based upon the earlier phases of testing, it is suggested that it will more than triple a subject's ability to safely hold their breath. As this woman spends hours a week and all of her vacations dedicated to free diving and exploring her passion, she is deeply excited to take part in this clinical trial.

4. A wealthy man seeking to be a father, long an avid and passionate baseball fan, approaches the genetic engineer of the IVF program he and his partner are about to start. He would like to take advantage of new abilities in editing mitochondrial DNA to ensure that his future child has mitochondrial DNA comparable to the sequences taken from several world-class athletes. This would mean more efficient power production in cells, as well as fewer reactive oxygen species (that damage DNA) being produced. Though similar changes have been made before in order to give those with mitochondrial genetic disorders[36] the

[35] Premila P. Samuel, Lucian P. Smith, George N. Phillips, John S. Olson. “Apoglobin Stability Is the Major Factor Governing both Cell-free and in VivoExpression of Holomyoglobin.” *Journal of Biological Chemistry* 290, no. 39 (2015). DOI: 10.1074/jbc.M115.672204

[36] Committee on the Ethical and Social Policy Considerations of Novel Techniques for Prevention of Maternal Transmission of Mitochondrial DNA Diseases; Board on Health Sciences Policy; Institute of Medicine; National Academies of Sciences, Engineering, and Medicine; Claiborne A, English R, Kahn J, editors. *Mitochondrial Replacement Techniques: Ethical, Social, and Policy Considerations.*

opportunity to have children, he is the first to request it for enhancement - specifically, his stated hope that his child has a strong ability to take part in his passion. He assures the hospital that money is no object, and the genetic ethicist brings the question to the hospital's ethics board.

5. A 25-year-old wishes to buy a common, comparatively inexpensive gene therapy that removes the gene in the cells of hair follicles that adds melanin to hair. This treatment leaves the patient with prematurely gray, silver, or white hair, in the style of many leading young artists. It has an excellent safety record, though the change is irrevocable. The cosmetic geneticist suspects that the patient may have body dysmorphic disorder.

Washington (DC): National Academies Press (US); 2016 Mar 17. 1, Introduction. https://www.ncbi.nlm.nih.gov/books/NBK355458/

HALAKHIC CONSIDERATIONS IN COSMETIC PROCEDURES RELEVANT TO GENETIC EDITING

In 1961, Lord Rabbi Doctor Immanuel Jakobovits, one of the first rabbis to specialize in medical ethics, gave the first public comment by a rabbi to deal with surgery undertaken for purely cosmetic issues in a symposium on religious views on cosmetic surgery in front of the American Society of Facial Plastic Surgery. He later wrote:

> *The problem was considered under four headings: the theological implications of "improving" God's work or, "flying in the face of Providence"; the possible risks to life involved in any operation; the Jewish objection to any mutilation of the body; and the ethical censure of human vanity, especially among males.*[37]

Jakobovits went on to summarize his read of Jewish tradition in light of these problems, and stated that any reservations about a procedure could be set aside on any of three conditions: a procedure was medically indicated, or was to correct a deformity serious enough to make it difficult to marry, or was necessary to enable a person to play a constructive role in society and earn a livelihood.

Though later responsa expanded the availability and permissiveness around cosmetic surgery, the four categories that he created became the framework which all subsequent *poskim* used. In greater detail:

[37] Immanuel Jakobovits, *Jewish Medical Ethics: A Comparative and Historical Study of the Jewish Religious Attitude to Medicine and its Practice* (New York: Bloch Publishing Company, 1959), 284.

1. *Chavalah*, or wounding: Wounding oneself without cause is proscribed. In the Talmud, *Bava Kamma* 90a-91b, there is a thorough discussion of Mishnah *Bava Kamma* 8:6, which forbids wounding oneself. The debate is over a *baraita* which suggests it might be permitted, only to be thoroughly rejected. Maimonides codifies the prohibition in the *Mishneh Torah* (though he bases this on Deuteronomy 25:3, not the Genesis 9:5 referenced elsewhere).[38] In the *Shulchan Aruch*, this is codified further in *Chosen Mishpat* 420:31. But the prohibition is constrained to unnecessary injury. Wounding oneself for a sufficient purpose would seem to be acceptable, leaving it to poskim to determine what is sufficient purpose.
2. *Sakanah*, or danger: It is forbidden to endanger one's life, a prohibition derived from Leviticus 18:5, which states, "these are the mitzvot which a person shall do and live by them," and discussed in Talmud *Yoma* 85b. In Isserles' commentary on the *Shulchan Aruch*, in *Yoreh Deah* 116:5, he goes even further to say that one should be wary of all things that cause danger, such as lingering under a leaning wall or lingering in a city where there is a plague. But once again, this prohibition is constrained to unnecessary danger. Endangering oneself for a sufficient purpose

[38] *Mishneh Torah Chovel* 5:1

would seem to be acceptable, leaving it to *poskim* to determine what is sufficient purpose.

3. Vanity: Several contemporary sources (Chabad,[39] Aish[40]) explain that Rabbi Jakobovits is speaking of the issues of men indulging in 'feminine' practices as forbidden in Deuteronomy 22:5. They may be taking their cue from Rabbi Shlomo Zalman Auerbach, who stated that men are forbidden from seeking plastic surgery for appearance alone.[41] It seems in any case that they are stating that any concern over appearance is a feminine trait, and therefore proscribed in men. But it is important to note that Jakobovits was not addressing a Jewish audience in his original presentation. In leaving his wording ambiguous, Jakobovits may simultaneously be alluding to issues of *tzniut*, or modesty in appearance. Too heavy a focus on appearance is contraindicated in Judaism due to this concern. This category also might be considered in concerns over violating the command toward humility found in Micah 6:8.
4. The theological implications of improving God's work. This is the hardest of all of Jakobovits' categories to define, with the widest

[39] Davidson, Baruch. "*Is Cosmetic Surgery Permissible According to Jewish Law?*" Chabad.org. Chabad, May 18, 2007. https://www.chabad.org/library/article_cdo/aid/521460/jewish/Is-Cosmetic-Surgery-Permissible-According-to-Jewish-Law.htm.
[40] Eisenberg, Daniel. "*Judaism and Cosmetic Surgery.*" Aish.com. Aish HaTorah, December 19, 2021. https://aish.com/48955041/.
[41] Abraham S. Abraham. Nishmat Avraham: Yoreh Deah. Rahway, New Jersey: Mesora Publications, 2000. Siman 155: 4 or Volume 2, p. 60.

potential scope of concerns. Jakobovits himself elaborated his view in a lecture in 1981 to several hundred Jewish scientists at Brookline Young Israel in Boston, conveniently about genetic engineering. He said,

> *"Genetic engineering" in the widest sense serves "to correct and improve nature." [...] The line between what is morally permissible and morally repugnant, it seems to me, would have to be drawn between "correcting" and "improving" nature, i.e. between therapeutic and eugenic objectives.*
>
> *To the extent to which genetic manipulation is intended and confined to promote the protection of human health from serious disorders or malfunctions, there would appear to be no objections in Jewish law. [...] There is in principle no difference in kind between such recourse to medicine or surgery and the application of human ingenuity to the prevention, cure or treatment of disease through "genetic engineering."*
>
> *But no such Divine sanction exists to warrant man's attempt to improve the designs of Providence...*[42]

[42] Immanuel, Jakobovits. "*Some Modern Responsa on Genetic Engineering*." Responsum: Genetic engineering. Medethics.org. Accessed April 14, 2023. https://www.medethics.org.il/wp-content/uploads/2020/02/RJ001171a.html.

Though Rabbi Jakobovits' wording is firm about the dividing line between correction and improvement, Jewish texts suggest otherwise and blur that distinction. In *Bereshit Rabbah* 11:6, it says:

> פילוסופוס אחד שאל את רבי הושעיה, אמר לו אם חביבה היא המילה, מפני מה לא נתנה לאדם הראשון, אמר לו [...] כל מה שנברא בששת ימי בראשית צריכין עשיה, כגון החרדל צריך למתוק. התורמוסים צריך למתוק. החטין צריכין להטחן. אפלו אדם צריך תקון.

> *A philosopher asked Rabbi Hoshiya, saying to him, "If the covenant [of circumcision] is so beloved, why was it not given to the first man?" He [Rabbi Hoshiya] said to him, [...] "All that was created in the six days of creation needs improvement. For example, mustard needs to be sweetened, and lupine needs to be sweetened, and the wheat needs to be ground,* ***and even a person needs to be improved."*** *(emphasis and translation my own).*

Rabbi Soloveitchik elaborated on this idea further in his work, *Halakhic Man*.[43] In it, he discusses how this midrash teaches that a person is obligated to make themself a better person - indeed, by doing so, one is obligated to become a partner in creation.

Perhaps the most illustrative textual example tackling the theological implications of improving God's work comes from the disagreement of commentators on the laws of *kilayim* from Leviticus 19:19. Though the concept of *kilayim* is not relevant to human genetic editing or cosmetic surgery, the basis on which the commentators explain the prohibition is directly relevant to the theological implications of improving God's work.

Leviticus 19:19 states:

את־חקתי תשמרו בהמתך לא־תרביע כלאים שדך לא־תזרע כלאים ובגד כלאים שעטנז לא יעלה עליך

My laws, you are to keep:

Your animal, you are not to [allow to] mate [in] two-kinds;

your field, you are not to sow with two-kinds;

[43] Joseph Dr. Soloveitchik. *Halakhic Man*. Philadelphia: Jewish Publication Society of America, 1991, pp. 102-109.

a garment of two-kinds, of shaatnez, is not to go on you. (Trans. Everett Fox)

Rashi addresses this statement by focusing on the introduction: "*My Laws, you are to keep:"* Specifically, believes that this statement differentiates everything that follows from the proceeding text, and explains: "these [laws of *kilayim*] are [like] the decrees of a king - there is no reason to the matter."[44] Accordingly, one cannot intuit any theology from them. These laws prevent tampering with God's work, but only in their very specific ways that would not seem to discourage other efforts to improve upon creation.

Ramban rebuts this notion, and implies that there *is* a reason, it has merely been kept from the reader. One who transgresses the prohibition against *kilayim* has actually violated the work of creation:

> *Thus one who combines two different species, thereby changes and defies the work of Creation, as if he is thinking that the Holy One, blessed be He, has not completely*

[44] Original text: חקים — אלו גזרת מלך שאין טעם לדבר

> *perfected the world and he desires to help along in the creation of the world by adding to it new kinds of creatures.*[45]

For Ramban, it would seem that the work of creation, as far as the differentiation of species goes, is completed. Efforts to improve upon it by blending two species, are referenced later in his commentary on Leviticus 19:19 as despicable. Ramban's wording is very important, as it opens the door to genetic modification with completely novel DNA sequences when it only forbids usage of material found in another species in nature.

Rashi and Ramban's conflicting explanations can help settle Jakobovits' open question about the theological implications of tinkering with the 'designs of Providence.' In the most limiting of these frameworks on genetic enhancement, we might reasonably be able to improve ourselves merely using only genetic patterns that already exists in human variation (such as the genetic mutations that give some humans 20/10 vision, or a need for four and a half hours of sleep), and define that as a standard to correct toward, as Jakobovits deems permissible.

[45] Original text: והמרכיב שני מינין משנה ומכחיש במעשה בראשית כאילו יחשוב שלא השלים הקב"ה בעולמו כל הצורך ויחפוץ הוא לעזור בבריאתו של עולם להוסיף בו בריות

Using genes found only in humans would seem to satisfy the requirements Ramban mentions in his explanation of *kilayim*. A more permissive framework might come from using Rashi's understanding, which would allow us to use genes found elsewhere in creation, though forbidden by Ramban. But a further option might be to synthesize entirely new sequences of DNA, in the spirit of co-creation that Rabbi Soloveitchik encouraged.

PRECEDENT IN HALAKHIC DECISIONS AROUND COSMETIC SURGERY

In 1964, Rabbis Moshe Feinstein, Yaakov Breisch, and Manasheh Klein responded to *she'elot* inquiring about the permissibility of cosmetic surgery. Each of them, and almost all authorities afterwards, utilized the framework proposed by Rabbi Jakobovits three years earlier. However, each of them and the rabbinic authorities after them have chosen to emphasize different aspects, and weigh the considerations quite differently.

Moshe Feinstein was asked whether a woman may undergo a rhinoplasty, a cosmetic procedure popular among Jewish women in that era, in order to improve her chance of finding a suitable husband.[46] In his work, he focused on the definition of *chavalah* by Maimonides, who wrote that the prohibition is against wounding done in a degrading (or belligerent) manner. Rabbi Feinstein used this wording to permit the surgery, since the wounding in it would be done for the benefit of a patient who requested it. He cited four Talmudic sources for his proof, one of which was *Bavli Bava Kama* 91b discussing the limits of *chavalah*:

> רב חסדא כד הוה מסגי ביני היזמי והגא מדלי להו למאניה אמר זה מעלה ארוכה וזה אינו מעלה ארוכה
>
> *Rav Ḥisda, when he would walk among thorns and shrubs, raised his clothing [even though he would be scratched]. [To justify this wounding] he said: This will heal, but that garment will not heal.*

[46] Teshuvot Igrot Moshe, Choshen Mishpat 2:66

In light of this definition of *chavalah* and the Talmudic evidence that wounding for one's benefit was practiced and acceptable, Rabbi Feinstein permitted the surgery and declared that such surgery was not a violation of *chavalah*.

Rabbi Chaim Jachter, in his discussion of this responsum, notes that it is difficult to determine what Rabbi Feinstein's opinion was on the field from his writings.[47] This responsum could be considered a sweeping endorsement of cosmetic surgery, but another interpretation would merely understand it as an extreme option allowed in a moment of extreme need.

Yaakov Breisch addressed the same question, likely from the same individual that year.[48] In his responsum, he first begins by addressing the element of danger. While past discussions of surgery have forbidden it on the basis of danger, he notes that the medical situation has changed. He cites Talmud *Bavli Yevamot* 72a, which permits activities involving danger if they are common behavior. He rules that from the perspective of risk, citing the complication rate of surgeries in that time, is acceptable to pursue cosmetic surgery as it is a thing that the majority of people find acceptably safe.

Furthermore, on the issue of wounding he cites a ruling in Talmud *Bavli Shabbat 50b*, which states that a person is permitted to remove scabs from their body to eliminate pain or discomfort, though not for beautification. Rashi pointed out that

[47] Jachter, Chaim. *"Cosmetic Surgery – a Review of Four Classic Teshuvot- Part One."* Kol Torah. Torah Academy of Bergen County, 2005. https://www.koltorah.org/halachah/cosmetic-surgery-a-review-of-four-classic-teshuvot-par-one-by-rabbi-chaim-jachter
[48] Teshuvot Chelkat Yaakov 3:11

the ban on this action for beautification is because it might be considered a feminine behavior. But the *Tosafot* expanded the permission drastically, writing, "If the only pain that he suffers is that he is embarrassed to walk among people then it is permissible, because there is no greater pain than this."

Rabbi Breisch, seeing that this definition of pain can include even the smallest psychological pain, permitted the surgery. Like Rabbi Feinstein, he is addressing a case of need. But he makes no comment on surgery done for other purposes. He also opens the door to an argument that a person seeking plastic surgery for even the smallest mental or physical pain can be called *choleh*, or ill, and hence permitted to seek the surgery if it would remedy that pain (this argument would not apply to those with body dysmorphic disorder).

Manasheh Klein also addressed this question in 1964.[49] He begins with a precedent from Talmud *Bavli Ketubot* 72b and the commentary in Tosafot *Ketubot* 74: a man betrothed a woman on the condition that she has no defect that would bar a *cohen* from serving in the Temple. The *Tosafot* point out in their commentary that if the blemish is corrected by a physician, the marriage is still legitimate. Based upon this, Rabbi Klein said one can do any cosmetic surgery to correct a blemish for appearance, with no need to justify it.

He further added, after his conversations with doctors, that he believed there was no danger worth mentioning in such a surgery; though if there were such a

[49] Mishneh Halachos 4:246

danger, the surgery is forbidden. Later, in a second responsum Rabbi Klein discussed plastic surgery and chemical peels in men and addressed the idea, from Deuteronomy 22:5, that feminine behavior is forbidden to men. He added that cosmetic procedures are forbidden to men if they are sought only for aesthetic enhancement, but that the prohibition does not apply if the reason for them causes the man embarrassment in social interaction. With a bit of foresight, he adds that such a distinction requires a great deal of intellectual honesty.

Yaakov Weisz wrote in 1967 his own responsum on cosmetic surgery, agreed with the logic of Rabbi Feinstein on issues of *chavalah*, and deemed the issue permissible on those grounds.[50] But he also delved into the notion of *sakanah*, and was deeply concerned about the danger. While Rabbi Weisz agreed with Rabbi Breisch that in some cases an individual who wishes to undergo plastic surgery could be considered a *Choleh*, he remained opposed to permitting plastic surgery for that person, since such a case was not in the category of *Choleh Sheyeish Bo Sakanah* (illness where there is danger). Rabbi Weiss stopped short of issuing a ruling, and he acknowledged that Rabbi Breisch's argument is a *Svara Gedolah*, a legitimate process of reasoning, but simultaneously he did not endorse it.

Eliezer Waldenberg, the former chief rabbi at the Sha'are Tzedek hospital in Jerusalem, stands as an outlier to the consensus of varying degrees of approval for cosmetic surgery. In his work, the *Tzitz Eliezer*, he categorically forbids all instances of

[50] Teshuvot Minchat Yitzchak 6:105:2

cosmetic surgery.[51] He begins by opposing surgery on someone who is not injured nor in (physical) pain, because it goes beyond the divine mandate of the physician to heal, derived from Exodus 21. Altering an appearance is not included in that work. He forbids such procedures as well on the grounds of danger, even though it may be vanishingly small, because there is no reason to justify it. He cites the text of Talmud *Bavli Taanit* 20b:

> נזדמן לו אדם אחד שהיה מכוער ביותר. אמר לו: שלום עליך רבי! ולא החזיר לו. אמר לו: ריקה, כמה מכוער אותו האיש! שמא כל בני עירך מכוערין כמותך? אמר לו: איני יודע, אלא לך ואמור לאומן שעשאני: "כמה מכוער כלי זה שעשית". כיון שידע בעצמו שחטא, ירד מן החמור ונשתטח לפניו, ואמר לו: נעניתי לך, מחול לי! אמר לו: איני מוחל לך עד שתלך לאומן שעשאני ואמור לו: כמה מכוער כלי זה שעשית.
>
> *He [Rabbi Elazar] met a man who was extremely ugly. He [the man] said to him, "Peace upon you, Rabbi!" and he [Rabbi Elazar] did not reply to him, [but] said: "Worthlessness! How ugly is this man! Are all the inhabitants of your city as ugly as you?" He [the man] said to him, "I've no idea, but go and say to the artisan who made me, 'how ugly is this tool you have made.'" When he {Rabbi Elazar] knew he had transgressed, he descended from his donkey and bowed before him, saying to him, "I humiliated you, forgive me!" He [the man] said to him, "I cannot forgive you until you go before the artisan who made me and say to him, 'how ugly is this tool you have made.'"*

[51] Waldenberg, Eliezer. *Tzitz Eliezer*, vol. 11, no. 41.

With this text as support, Rabbi Waldenburg goes so far as to state that cosmetic surgery is an affront to God for the implication that God's work is in some way flawed.

Ovaadia Yosef was the former chief rabbi of Israel and a famous Sephardic legal scholar. His extensive responsum[52] on cosmetic surgery curiously is not referenced by any other work I could find in medical literature, a curiosity because it is simultaneously so permissive and incredibly thorough.[53] In his work he relatively enthusiastically permitted cosmetic surgery for a woman who wrote to him about it. After a discussion of *chavalah*, he dismissed the concern. Later, he dismissed the prospect of *sakanah* in a section showing incredible familiarity with the nuances of surgical risk. He specifically referenced modern declining procedure times and the effects on all-cause mortality when patients spend shorter durations under anaesthesia .

Rabbi Yosef permits this surgery for the sake of attraction. For a married woman, he assumes it will improve a relationship. For an unmarried woman, he assumes it will lead to a desired marriage. But among the motivations he lists as

[52]Yabia Omer 8:12

[53]In light of how unusual his responsum is, I have included part of the original text here:
רבי עובדיה יוסף שליט"א בספר יביע אומר (חלק ח חו"מ סימן יב) וז"ל: "נראה באמת דכשהאשה חפצה מאד להתנאות ביופיה ע"י ניתוח כזה, והניתוח נעשה ע"י הרדמה, ואינה מרגישה באותה שעה שום צער כלל, ואח"כ נהנית מזה באופן תמידי, והריוח יותר מן ההפסד והצער, בכה"ג שפיר דמי, ואין זה בכלל החובל בעצמו שאינו רשאי, ...ואם פנויה היא עושה כן כדי שיקפצו עליה בני אדם מהוגנים להנשא, ואם נשואה היא עושה כן כדי להתחבב על בעלה [...] "בזמנינו עם התפתחות המדע הרפואי, אין בניתוח כזה חשש סכנה כשהוא נעשה ע"י רופא מומחה ובעל נסיון, אע"פ שבעצם הרדמה כללית יש בה חשש סכנה, זהו דוקא בהרדמה עמוקה וארוכה של ניתוח שנמשך כמה שעות ארוכות, אבל הרדמה של ניתוח קל כזה שנגמר תוך שעה קלה לית לן בה, ולכן נראה שיש להתיר לנערה לעשות ניתוח פלסטי כדי לשפר את צורתה ויופיה הטבעי למצוא חן בעיני כל רואיה, ושתוכל למצוא שידוך הגון כפי כבודה, ואפילו אם היא אשה נשואה יש להתיר לה לעשות כן כדי להתחבב יותר על בעלה, ובלבד שיהיה ע"י רופא מומחה ובעל נסיון רב, וזריז וזהיר במלאכתו, שלא תצא תקלה מתחת ידו, וכן נראה להתיר כן גם לאיש שיש מום בפניו או כתמים רבים עד שהוא מתבייש ללכת ככה בין הבריות, וכל שכן אם זה מפריע לו למצוא עזר כנגדו, ואין בזה משום לא ילבש גבר שמלת אשה".

permissible, he includes the interesting line, "to be liked by all who see her." The implications of this permitted reasoning seem to allow for the changing of appearance based on social norms.

Similarly to the reasoning of Rabbi Manasheh Klein, Rabbi Yosef permits cosmetic procedures for a man only to correct a blemish, but not to improve appearance, on the condition that the blemish causes shame or prevents him from arranging for a suitable marriage.

Modern summaries slowly have codified the approach that began with Rabbi Jakobovits. As early as 1977, Rabbi David Bleich wrote a summarizing article in the journal *Contemporary Halachic Problems* in which he took no stance personally, but portrayed the approaches of Rabbi Yaakov Breisch and Rabbi Manasheh Klein as normative.[54] He did not rebut the responsum of Rabbi Waldenberg so much as report on it, then ignore it. Subsequent analysis, like that of Rabbi Chaim Jachter,[55] make it clear that the stance of Rabbi Waldenberg is now seen as somewhat of an island. However, both Rabbi Bleich and Rabbi Jachter, in their summaries of the field, reported the trend towards permissibility in situations of need, and made no comment on elective procedures for convenience.

A major *halakhic* reference book of Jewish medical law, the *Nishmat Avraham*, published in 2000, codifies this further, and adds the commentary of Rabbi Shlomo

[54] Bleich, J. David. *Contemporary Halakhic Problems*. United Kingdom: Ktav, 1977. p. 119.
[55] Jachter, Chaim. *"Cosmetic Surgery – a Review of Four Classic Teshuvot- Part Two."* Kol Torah. Torah Academy of Bergen County, 2005. https://www.koltorah.org/halachah/cosmetic-surgery-a-review-of-four-classic-teshuvot-part-two-by-rabbi-chaim-jachter.

Zalman Auerbach as reported by the author, Rabbi Abraham Abraham.[56] Rabbi Auerbach says in rebuttal to those who forbid cosmetic surgery that it actually is clearly permitted, and bases his ruling on the Tosafot on Talmud *Bavli Yevamot* 34a and on the Talmud *Bavli Nazir* 49b. He adds that this ruling is only for blemishes, not beauty, again limiting the scope of his permission, without addressing wider questions of convenience.

A 1992 responsum by the CCAR Responsa Committee[57] notes these precedents, though confusingly reads the *halakha* around cosmetic surgery as ambivalent about permission. The responsum does note that Rabbi Waldenberg began from a starting place of the definition of medicine and accordingly was doomed to forbid elective procedures, while Rabbi Moshe Feinstein began with the social benefits of the procedure and is able to permit it by working from there. Still, like most of the previous responsa, the CCAR responsum places little value on appearance. It also notes the danger of the procedure, though it does not attempt to evaluate the risk/benefit ratio. Additionally, it asks what the existence of elective procedures say about superficiality and materialism in the modern world. The conclusion is: "the notion that purely cosmetic surgery is beneficial to mental health must as a general rule be resisted. We would therefore urge that rabbis advise

[56] Abraham S. Abraham. *Nishmat Avraham: Yoreh Deah*. Rahway, New Jersey: Mesora Publications, 2000. Siman 155: 4 or Volume 2, p. 60.
[57] "CCAR Responsa: Cosmetic Surgery, 5752.7." CCARNet, Central Conference of American Rabbis, 1992. https://www.ccarnet.org/ccar-responsa/tfn-no-5752-7-127-132/

against cosmetic surgery undertaken solely for the improvement of personal appearance."

A 2010 Article in YNET discusses changing attitudes[58] in Israel toward cosmetic surgery, and the increased acceptance of cosmetic procedures among religious authorities. It seems that in Israel, a permissive perspective has emerged victorious. The extent of that permissiveness seems to currently be growing. The author mentions that public shifts in attitude toward these procedures, as well as a new norm around what is common and what is safe, have rewritten the map for Jews seeking cosmetic enhancement. This change has even entered the *Haredi* demographic in Israel, with doctors referencing their *Haredi* patients who come in for reasons that earlier rabbis may not have considered sufficient need.

[58] Hirschfeld, Tzofia. "Haredi women go under the knife." ynetnews.com, November 24, 2010, https://www.ynetnews.com/articles/0,7340,L-3982150,00.html

SUMMARY OF APPROACHES TO COSMETIC SURGERY

(in descending order by date composed)

Posek - Issue	Chavalah	Sakanah	Vanity	Theological Implications	Other Concerns
Rabbi Immanuel Jakobovits	Identified Concern	Identified Concern	Identified Concern	Identified Concern	N/A
Rabbi Moshe Feinstein	Permitted on account of the definition found in the Mishneh Torah.	N/A	N/A	N/A	N/A
Rabbi Yaakov Breisch	Permitted on account of analogy to removing scabs	Permitted on account of consultation with experts	Permitted to women, and men in cases of shame	N/A	N/A
Rabbi Menasheh Klein	N/A	Agrees that danger would be cause to prohibit, but determines there is not enough danger	Permits to corrections and improvements to women, and corrections to men in cases of shame.	N/A	Cites the example of a marriage dependent on no blemish being permitted if a doctor corrects that blemish
Rabbi Yaakov Weisz	Agrees with Rabbi Feinstein	Forbidden on this account	N/A	N/A	Requires a person to be *Choleh Sheyeish Bo Sakanah*
Rabbi Ovaadia Yosef	Permitted	Permitted, on the	Permitted completely	N/A	Even says that surgery can be

		understanding that the procedure (and crucially, the anaesthesia) is short			undergone, “to improve all who look at her”
Rabbi Eliezer Waldenberg	N/A	Forbidden, even for the smallest danger, as there is no justifying reason	N/A	States that cosmetic surgery is a theological insult to God.	Additionally rejects any cosmetic surgery on the basis of it not being included in the physician’s mandate to heal from Exodus 21:20
Rabbi Shlomo Zalman Auerbach	Permitted	Permitted	Permitted only in cases of correcting blemishes, but not for issues of beauty	N/A	N/A
The Central Conference of American Rabbis Responsa Committee	Cites Rabbi Feinstein	Specifically brings up the dangers of (then) recently recalled silicone breast implants, though acknowledges that some procedures may be safe	States that cosmetic surgery is a reflection of an American superficial and materialistic culture	N/A	Encourages rabbis to advise against

NOTES ON APPLICATION TO GENETIC EDITING

I propose that the same framework of four considerations suggested by Rabbi Jakobovits can be applied to address many of the issues raised on an individual level by early applications of elective genetic modification. Unlike Dr. Newman and Dr. Burack's respective proposals, this framework may not account for the issues at a societal level, but quickly addresses the simple issues. In the following section, I work through each of the earlier hypothetical cases using the framework and precedents from *halakhic* considerations of elective surgery.

It is worth mentioning two of the main considerations that this framework does not address. Firstly, the best time to genetically edit any organism is at the stage of a single cell (before the blueprint written in that code is put into action). In this manner, a key issue of genetic modification is quite different from that of surgery - the patient cannot consent to the procedure. However, it is important to note that Jewish tradition does not always solicit consent from children (for example, children are educated, protected, and healed regardless of their wishes). Jewish tradition does expect, in almost every interaction involving a child, that a parent acts according to what they determine as the best interests of a child over their own interests. The case of genetic modification for a future child is no exception.

Secondly, unlike in an elective surgery, where a patient may request a change for themselves, genetic editing includes the possibility of germ line modification, where a therapy may also edit the DNA of ovum or sperm, making that change heritable in perpetuity. Many of the genetic changes that people might request for

themselves are genetic changes they may also wish to offer to their offspring. However, the potential for altering untold future human beings means that such decisions (when they do not overtly benefit the quality of life of a person) might require a degree of care and an entirely different metric of evaluation beyond the framework proposed here.

APPLICATION TO EXAMPLE CASE STUDIES

Aspiring parents from a family with a long history of developing osteoporosis hope to help their future child avoid that fate, and increase overall their future child's quality of life. To do so, their geneticist plans to edit the DNA of a fertilized ovum in the area of the androgen receptor gene to give their child 12 CAG repeats. In most people, the typical androgen receptor gene has 10 to 32 repeats of the DNA sequence CAG; but the fewer repeats there are in the gene, the more responsive an androgen receptor is to being stimulated. This increased activation of androgen receptors leads to an increased ability to build and maintain muscle mass over a lifespan—a key way of preventing osteoporosis that might naturally happen in later life, but also of giving a child an incredible increase in strength throughout their entire life relative to their peers.

Considerations: In this case, and many cases of genetic editing, *chavalah* becomes a non-issue. Just as Rabbi Feinstein pointed out in his responsum, the injury (a cut in a DNA strand that removes several nucleotides before being reassembled) is not done in a manner that is degrading or belligerent. Still, two key differences separate this case from Rabbi Feinstein's responsa: firstly, that the wound is not quite healed but is instead a new normal state of existence, and secondly, that the patient in this case did not directly ask for the wounding.

Sakanah, or the danger, is a different story. If the technology (both the viral vector that delivers the editor, and the editor itself) is a stable system, it will

quickly become a non-issue. But the outcome of the change is a different matter entirely. While the opportunity exists for this to increase the quality of life for the family, it is also likely that individuals with fewer CAG repeats will have an increased risk of prostate cancer.[59] Only once this risk has been addressed by a genetic expert can this be considered acceptable.

Issues of vanity, such as maintaining the wider ideal of humility referenced in Micah 6:8, hinge here on the motivations and intentions of the parents. Such a change would result in more muscular descendants, with a competitive advantage in every form of athleticism over those without the change. But parents motivated by the quality of life of their descendants and the hope that their child avoids osteoporosis are well within the right. Such a decision, as Rabbi Klein mentioned in his responsum, requires a great deal of intellectual honesty.

Theologically, this change involves using a genetic sequence found already in many, many people. Because of this, it does not violate Ramban's understanding of categories—indeed, it may not be seen at all as a major form of change but rather as a correction to a norm that already exists, a change even Jakobovits might approve of. Although correcting a genome up to a norm already existing in the genetic code of others could be considered an action that reduces

[59] E. Giovannucci,, Stampfer, M. J., Krithivas, K., Brown, M., Dahl, D., Brufsky, A., Talcott, J., Hennekens, C. H., & Kantoff, P. W. (1997). "The CAG repeat within the androgen receptor gene and its relationship to prostate cancer." *Proceedings of the National Academy of Sciences of the United States of America,* 94(7), 3320–3323. https://doi.org/10.1073/pnas.94.7.3320

the diversity of creation, reducing the diversity of lower quality of life experiences makes this action much more permissible.

Parents with a young boy with poor emotional regulation approach a geneticist. Though they have long resisted any gene modification that their peers who are parents embraced, they are at their wits end. They have learned that gene therapy that targets a gene, 5-HTTLPR, slightly lowers sensitivity to emotional information in the environment,[60] with far fewer side effects than medication. While they do not believe there is anything wrong with their child and consider him normal, they are watching with worry as he falls farther and farther behind his peers in school.

Considerations: Similarly to the first case, few could make the argument that this modification can not be undertaken for reasons of *chavalah*. In issues of *sakanah*, this change depends on a proven, stable delivery of the gene, though the text notes directly that the actual edit results in far fewer side effects than common medications. A rabbi dealing with this issue might ask however if the family has considered even safer options such as a more supportive school, therapy, or additional help in the classroom.

In issues of vanity, it is clear that these parents are not motivated by a competitive advantage or issues that might violate the value of humility. But the

[60] C. Beevers, G., Ellis, A. J., Wells, T. T., & McGeary, J. E. (2010). "Serotonin transporter gene promoter region polymorphism and selective processing of emotional images." *Biological Psychology*, 83(3), 260–265. https://doi.org/10.1016/j.biopsycho.2009.08.007

theological implications here are worth considering, especially incorporating the questions that Rabbi Aaron Mackler wrote about in his paper, "*Genetic Enhancement and the Image of God.*" This is a change that does alter a human's intellect, compassion (though for the better), and touches on these fundamental characteristics of being associated with the divine image. Though this change might be for the better, it is important to ask if the child desires this. Judaism has a rich history of encouraging the development of these qualities, but usually in cooperation with those who are receiving the changes.

Finally, this is another example of a change to a genetic configuration that exists elsewhere in human beings, making many questions of the relevant theological implications quite simple.

A woman whose passion is freediving, or unassisted diving merely by holding one's breath, is debating if she should participate in a clinical trial focused on myoglobin in humans. Myoglobin is a molecule capable of storing oxygen in cells, with a longer duration capability of and capacity for oxygen storage than the more commonly expressed hemoglobin. Though humans naturally have both molecules in their cells, whales and other diving mammals have much greater concentrations of myoglobin, and they have a subtly different version of it that is much more stable. The woman hopes to participate in a clinical trial with a gene therapy that modifies the human gene to the more stable form, then upregulates the expression of the gene

to be almost twice as common. Based upon the earlier phases of testing, it is suggested that it will more than triple a subject's ability to safely hold their breath. As this woman spends hours a week and all of her vacations dedicated to free diving and exploring her passion, she is deeply excited to take part in this clinical trial.

Considerations: As above, *chavalah* is likely not an issue in this case. In issues of *sakanah*, this change depends on a proven, stable delivery of the gene…but even if the platform is proven, the outcome is not, as this is a clinical trial. As mentioned above, the *Shulchan Aruch* prohibits placing one's life in danger. Clinical trials are usually an exception to this—the need not only of the individual but the need to create better health care override these concerns. As Rabbi Moshe Tendler says, "we advocate that volunteering for such trials is not only a *chesed* but engenders social responsibility so that Jews are contributing to the overall health of our society."[61] However, in this case, the outcome is not related to the health of the individual and is not described as being undertaken for the health of wider society, and so this would not be considered a case where the outcomes justify the danger to one's life. The individual should wait until this modification has an established safety record.

On issues of vanity and humility, as this has little to do with appearance, it avoids most of the common discussion around this issue. Is the reason for seeking

[61] R. M. Tendler, & Loike, J. D. (2015). "Mitochondrial Replacement Therapy: Halachic Considerations for Enrolling in an Experimental Clinical Trial." *Rambam Maimonides Medical Journal*, 6(3), e0031. https://doi.org/10.5041/RMMJ.10216

it out sufficient to overcome issues of what danger (with an established safety record) remains? Certainly if it were for a profession or livelihood it would be acceptable, but for the sake of a hobby? Though some more traditional sources might say this is or effort that is better spent toward more Jewish aims, others might point out the Jewish case for increasing happiness, joy, and the exploration of *maaseh briut*, the works of creation. In this case, it is important to note the difference between Ashkenazi and Sephardi rulings on *halakha*, where the latter tend toward greater leniency.[62]

Theologically, this case involves the usage of DNA sequences found already in nature, but not in human beings. As such, it may run afoul of Ramban's rulings about blending of categories already defined in creation. It is important to note that while Ramban wrote about this in regards to *kilayim*, this is not the issue in play here. Complicating this further is that the genes for myoglobin already exist in human beings, but this form is only slightly (less than 1%) different. Rabbinically, a future adjudicator of this law will need to decide at what point a modification of a gene causes that gene to become an entirely new gene in and of itself.

A wealthy man seeking to be a father, long an avid and passionate baseball fan, approaches the genetic engineer of the IVF program he and his partner

[62] Ariel Picar, *Rabbi Ovadia Yosef's Mishna in the Age of Changes*, Bar-Ilan University Press, 2007. See also: Shlomo Fisher and Zvi Beckerman (2001), "'Church' or 'Cult'?" in *Shas Etgar Israeliot,* ed. Yoav Peled (Tel Aviv: Yedioth Ahronoth), 321-342.

are about to start. He would like to take advantage of new abilities in editing mitochondrial DNA to ensure his future child has mitochondrial DNA comparable to the sequences taken from several world-class athletes. This would mean more efficient power production in cells, as well as fewer reactive oxygen species (that damage DNA) being produced. Though similar changes have been made before in order to give those with mitochondrial genetic disorders the opportunity to have children, he is the first to request it for enhancement - specifically, his stated hope that his child has a strong ability to take part in his passion. He assures the hospital that money is no object, and the genetic ethicist brings the question to the hospital's ethics board.

This edit technically is a form of modification to mitochondrial DNA and uses a different technique, which falls under the category of mitochondrial replacement therapy.[63] *Chavalah* in this case is a different form of wounding that may be thought of as more analogous to a surgery (removing and replacing a part), though this form has an easier precedent and is also permitted.

A person with sufficient resources could successfully do this procedure today. This form of modification has an established track record, and is currently in use for parents with specific mutations that would otherwise prevent them from successfully having children. Clinical trials were already carried out years

[63] R. M. Tendler (2015)

ago, and Jews were encouraged to participate in them.[64] As such, there are few issues of *Sakanah* here.

While this example would have similar outcomes on a child as the first case, the motivation is very different. While the first case sought to expand the opportunities and quality of life of a future child, this example is of a person seeking changes to make his child into his own vision - changes implemented not so much for the child's future good, but the parents. With such similar changes coming from such different motivations, Rabbi Klein's point on the intellectual honesty of motivation is pertinent here.[65]

With no ability for a child's consent, a critic might ask - imposing changes upon a child for the sake of ability in baseball is discouraged, but what about for the sake of learning Torah? What makes the latter imposition any better than the former? To fully differentiate between these motivations, we might need to turn to the work of Newman and Burack for their respective frameworks, and analyze the long term implications of such a change. In the interim however, a clear hallmark of the responsa around cosmetic surgery is their intention to confer primary benefit upon the individual being changed; an excellent, if rough, heuristic that can be applied to most cases of elective genetic engineering. Unlike a father's desire for a child to play baseball or to pursue any worldly interest he valorizes, tradition conceives of Torah learning and ability as intended to convey benefit

[64] ibid.
[65] Also pertinent might be the Catholic notion of Dual Effect, in which an action ordinarily forbidden for one motivation is permitted for another motivation, even though they lead to similar outcomes.

upon the learner. But even this can go wrong. The story of Elisha Ben Avuyah and his beginnings in Talmud *Yerusalmi Hagiga* 2:1 illustrates the displeasure of tradition when even this highest of causes is approached in an inappropriate way: Avuyah, upon seeing the power that study of Torah had given Rabbi Eliezer and Rabbi Yoshua, resolved that his son would be a Torah scholar. In doing this out of a selfish reason, he doomed all his son's study to end in inevitable heresy — and illustrated the importance of empowering children for the correct reasons.

A 25-year-old wishes to buy a common, comparatively inexpensive gene therapy that removes the gene in the cells of hair follicles that adds melanin to hair. This treatment leaves the patient with prematurely gray, silver, or white hair, in the style of many leading young artists. It has an excellent safety record, though the change is irrevocable. The cosmetic geneticist suspects that the patient may have body dysmorphic disorder.

While issues of *chavalah* are again not an issue here, the question of *sakanah* comes into question as the benefit here becomes small enough to make even a small risk questionable, even if the technology has an extensive, stable track record. The exhortation to be deliberate in judgement from *Pirkei Avot* 1:1 would seem to apply here.

In this case, the patient is suspected of being motivated out of body dysmorphic disorder. One interpretation of this case might immediately condemn

the patient on the basis of a decision out of vanity, as body dysmorphic disorder is defined by a preoccupation with appearance. But another route might be to understand the patient as *choleh*, or sick, as Rabbi Briesch did in his responsum.

Rabbi Briech specifically permitted interventions to repair issues of appearance that are causing distress. Yet distress in cases of body dysmorphia is only localized around appearance, and is rooted in a mental illness; and research shows clearly that those with body dysmorphic disorder who undergo cosmetic procedures rarely report positive outcomes. As such, understanding the issue not as one of vanity but as seeking the correct treatment for a *choleh* may be more appropriate.

CONCLUSION

In this work, I sought to address the difficulty of finding appropriate precedent and syllogism within Jewish law and ethics for genetic modification beyond a medical necessity. I proposed that the most pertinent *halakhic* syllogism to elective genetic modification is the existing body of work around cosmetic surgery. This syllogism can help explain the motivations of early adopters of this technology, and offers a strong, well-developed body of Jewish law to address issues and complications raised by early, simpler potential situations of gene modification for non-medical use.

It is extremely important to note that this framework is only helpful in dealing with the early, immediate potential aspects of genetic editing. While the future of what genetic editing may look like in the more distant future is unclear, scientists understand that at some point genes will be treated as more analogous to software programs. The secular Jewish computer scientist Raymond Kurzweil points out that (among the many implications of this) this understanding and the abilities that go with it will allow for the hybridization of biological and nonbiological thinking and existence.[66] Analogy to cosmetic surgery can only go so far—and for this, the broader, values-based frameworks of Newman and Burack are needed. However, their frameworks are only helpful at scale, while the

[66] Ray Kurzweil. *The Singularity Is Near: When Humans Transcend Biology.* United States: Penguin Publishing Group, 2005.

immediate challenges will happen incrementally. For this, a framework of enhancement is required that can handle these more minor issues.

Additionally, it must be stated that this framework simply deals with the individual implications of elective genetic modification. On a wider societal level, the question of who has access to these technologies, and on what basis, needs to be addressed. Should a city's Jewish Family Service offer basic genetic enhancement for hopeful parents in need, in the same way that the other services are offered? *Tosefta Peah* 4:10 mentions a city being required to fund a soup kitchen, a communal fund for the poor, and the collection and distribution of clothing; at what point could an enhancement for a child be regarded as a societal need? These questions around genetic enhancement must also be tackled, and are not addressed by the syllogism of cosmetic surgery.

Nietzsche, in his *A Genealogy of Morals*, critiques the Jewish preoccupation with caring for the poor, the weak, needy, or vulnerable as a slave mentality of the oppressed.[67] But a successful society with the capability of genetic enhancement must foster these Jewish ideals, or risk creating a permanent class of the disadvantaged, etched into their DNA. The theological considerations of Jakobovits, an afterthought in his original framework around the Jewish approach to enhancement, will slowly grow to be the dominant issue around elective genetic modification that must be addressed.

[67] Tille, Alexander., Nietzsche, Friedrich Wilhelm., Haussmann, William August. *A Genealogy of Morals*. United Kingdom: Macmillan, 1897.

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