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The Case for Genetic Engineering

The Human Genome Project is the effort to map and sequence the entire complement of genetic material in the chromosomes of human beings—100,000 genes composed of about three billion base pairs of nucleotides which make up DNA.

Does the genome project encroach upon the Divine plan for this world by interfering with nature as God created it? Is genetic engineering tantamount to changing the Divine arrangement of Creation? Although some rabbinic authorities answer in the affirmative,¹ most consider the acquisition of knowledge for the sake of finding cures for human illnesses to be divinely sanctioned, if not in fact mandated. God blessed Adam and Eve with the phrase “replenish the earth and subdue it” (Gen. 1:28). This phrase is interpreted by Ramban (Nahmanides) to mean that God gave human beings dominion over the world, in the sense that they may use animals, insects and all creeping things for the benefit of humanity. To subdue the earth, according to R. Samson Raphael Hirsch, is to master, appropriate, and transform the earth and its products for human purposes. To have “dominion over the fish and over the birds and over every living thing on earth” (Gen. 1:28) means to use them for human benefit. The pursuit of scientific knowledge does not constitute eating from the prohibited tree of knowledge of Gen. 2:17. Whatever is good for humanity is both permissible and praiseworthy. King David states that “The heavens are the Lord’s heavens, but the earth

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He has given to mankind” (Ps. 115:16), thereby further supporting the concept that knowledge and its pursuit are legitimate activities for human beings and not considered an encroachment upon Divine prerogatives.

Therapeutic genetic engineering and gene therapy that may result from knowledge derived from the genome project therefore does not violate the Torah by undermining God’s creation of the world as cross-breeding would (see Ramban’s commentary to Lev. 19:19). On the contrary, it is a confirmation of the creation of the world by God. The use of scientific knowledge to benefit mankind is biblically mandated (cf. Ramban to Gen. 1:28). The use of such knowledge to heal illness and cure disease is also biblically allowed, based on the school of R. Yishmael’s talmudic interpretation (*Bava Kamma* 85a) of the phrase “and heal he shall heal” (Ex. 21:19), and perhaps is even biblically mandated based on Maimonides’ interpretation of the biblical obligation to restore a lost object (Deut. 22:2) as including the restoration of one’s lost health (Commentary to the Mishnah, *Nedarim* 4:4). The healing of illness includes the use of genetically engineered medications such as insulin and antibiotics. The cure of disease by gene therapy, if made possible by science, would also be sanctioned by Jewish law.

The production of hormones such as insulin and erythropoietin, as well as of antibiotics and other therapeutic substances by genetic engineering through recombinant DNA technology, is permitted by Jewish law because nature is being properly used for the treatment and cure of illnesses. Gene therapy—such as the replacement of the missing enzyme in Tay-Sachs disease or the missing hormone in diabetes, or the repair of the defective gene in hemophilia or Huntington’s disease, if and when these become scientifically feasible—is also probably sanctioned by Jewish law, because it is meant to restore health and preserve and prolong life. The technical medical problems of modifying the defective gene or genes in an individual sperm, ovum or zygote by gene surgery and implanting the replaced or repaired genes into the mother, thereby producing a healthy child, have not yet been surmounted. However, assuming gene surgery can be successfully performed, it would probably be sanctioned by rabbinic authorities as a legitimate implementation of the physician’s mandate to heal the sick.

Another argument favoring the permissibility of gene surgery or genetic manipulation is the fact that neither the sperm nor the ovum nor even the fertilized zygote are persons. For this reason, gene manipulation is not considered tampering with an existing or even potential human being; that status is bestowed in Jewish law only upon a fetus

implanted in the mother's womb. One can also argue that any surgery performed on a live human being must certainly be permitted on a sperm, ovum or fertilized zygote. For example, if surgical cures for hemophilia, Tay-Sachs disease or Huntington's disease were possible, those procedures would surely be permissible. Hence, it should certainly be permissible to cure or prevent these diseases by gene surgery.

Rabbi Moshe Hershler raises the question of whether it is permissible to experiment with gene therapy to try to save the life of a child with thalassemia or Tay-Sachs disease, if the unsuccessful outcome of the experimentation would be a shortening of the child's life.² R. Hershler is of the opinion that gene therapy and genetic engineering may be prohibited because "he who changes the [Divine] arrangement of creation is lacking faith [in the Creator]" and he cites as support for his view the prohibition against mating diverse kinds of animals, sowing together diverse kinds of seeds, and wearing garments made of wool and linen (Lev. 19:19). This line of reasoning is rejected by Rabbis Shlomo Zalman Auerbach and Yehoshua J. Neuwirth, who reject the analogy between genetic engineering and grafting diverse types of animals or seed.³ The main purposes of gene therapy are to cure disease, restore health, and prolong life, all of which goals are within the physician's Divine license to heal. Gene grafting is no different than an "organ graft," such as a kidney or corneal transplant, which nearly all rabbinic authorities consider permissible.

However, good is often not pure but is mixed with some potential danger. The genome project is certainly good in terms of its potential to lead to cure of diseases, but the project also raises many concerns insofar as it raises the possibility of cloning.

There is no specific halakhic prohibition against attempting to clone a human being. An example of the creation of an artificial human being or *golem* is cited in the Talmud (*Sanhedrin* 65b). The *golem*, however, was not formed in and born from a woman's womb and was therefore not considered human. It was destroyed without that act constituting murder. A cloned human being, however, has the full status of a human being. Although in Jewish law it is not prohibited to clone a human being, one should be very cautious and not do so indiscriminately. Many potential scientific and Jewish legal problems will need to be dealt with first. The risks of producing serious birth defects in human cloning are not known.

In Judaism, paternity is determined by the sperm.⁴ But in human cloning, no sperm is used; so who is the father? Does the couple that

engages in human cloning fulfill the biblical concept of procreation? If DNA is used for cloning from a man other than the woman's husband, is the child a bastard (*mamzer*) in Jewish law? Human cloning can be accomplished without any male input. Women will not need men to have children. The social and Jewish legal and moral implications of such human replication are mind-boggling. Are we converting or manipulating nature in ways that go beyond the scope of the Divine command to utilize nature for human benefit?

There are no clear halakhic precedents in biblical or talmudic literature. One study concludes that human cloning technology is permissible "if used as a form of medical intervention for infertility or to correct genetic defects in children."⁵ For many authorities, for man to create man may infringe upon the prerogatives of the Divine Creator. Even so, under very limited circumstances, "human cloning, when scientifically prudent and undertaken with appropriate safeguards, may be deemed appropriate and halakhically sound."⁶

The possible deleterious effects of genetic engineering and gene therapy are not yet fully known. Can such genetic manipulation unmask inactive cancer genes? Thus, in addition to the medical and scientific aspects of genetic engineering, DNA recombinant research and human cloning, the spiritual and theological aspects also require exploration. Rabbis must examine these issues from the Jewish viewpoint and offer halakhic guidance to the medical and lay communities.

In summary, genetic screening, gene therapy and other applications of genetic engineering are permissible in Judaism when used for the treatment, cure, or prevention of disease. Such genetic manipulation is not considered to be a violation of God's natural law but a legitimate implementation of the biblical mandate to heal. If Tay-Sachs disease, diabetes, hemophilia, cystic fibrosis, Huntington's disease or other genetic diseases can be cured or prevented by "gene surgery," such intervention is certainly halakhically permitted.

Notes

1. Moshe Hershtler, "Genetic Engineering in Jewish Law," *Halakhah u-Refuah*, vol. 2 (Chicago, 1981), 350-353.
2. Ibid.
3. Abraham S. Abraham, *Nishmat Avraham*, vol. 4 (2nd edition, Jerusalem, 1993), *Hoshen Mishpat* 425:2, pp. 215-218.

4. Abraham Steinberg, "Paternity," *Journal of Halacha and Contemporary Society*, No. 27 (Spring 1994): 69-84.
5. John D. Loike and Abraham Steinberg, "Human Cloning and Halakhic Perspectives," *Tradition* 32, 3 (1998): 31-46.
6. J. David Bleich, "Cloning: Homologous Reproduction and Jewish Law," *Tradition* 32, 3 (1998): 47-86.