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The Two Faces of Genetic Engineering in Man

To those who deal with the victims of hereditary defects there can be no question that gene therapy—the use of genetic engineering to correct such defects—is an admirable goal, solidly within the traditions of medicine. Moreover, for the loosely organized cells of the bone marrow (though not for those of most organs) cure by implantation of genes in somatic cells now seems only a few years off. Unfortunately, however, the cold term “genetic engineering” has suggested to the public other, nonmedical potential uses of the techniques, such as reshaping our physiques or our personalities, cloning favored adults, or creating subhuman hybrids.

Two years ago the three main religious groups in this country sent President Carter a joint letter that viewed research in this area as a source more of danger than of benefit. The issue was referred to an excellent presidential commission, with Morris B. Abram as chairman and Alexander Capron as executive director. Its recent draft report, and subsequent congressional hearings under Representative Albert Gore, Jr. (D-Tenn.), strongly supported the conclusion that gene therapy is a thoroughly legitimate goal. The problem has thus been handled in a much more sensible way than the emotional earlier debate over recombinant bacteria. Also encouraging is the restrained response of the major media to the recent announcement that the implantation of a gene for growth hormone into cells of mouse embryos had produced a giant strain. Evidently gene therapy itself, separated from other kinds of genetic engineering, no longer seems to present moral problems different from those of other kinds of experimental therapy, and these are supervised by local bioethics committees.

On the other hand, both the commission and some participants in the hearings viewed changes in the germ plasm as more dangerous than somatic corrections because they tamper with evolution. But, by domesticating animals and extinguishing species, man has been tampering for a long time. Moreover, as a form of preventive medicine, gene therapy in human embryos would have the same effect on the gene pool as an accepted approach: prenatal diagnosis, leading to selection for normal embryos in a family of carriers. The evolutionary argument thus does not carry much weight. However, there is a practical consideration that will deter responsible investigators from altering human embryos for a long time to come: the need for virtually perfect reliability. In somatic cell therapy a 50 percent cure rate would be a triumph, but manipulations of embryo cells that damaged even one child in a thousand would be intolerable.

Although the commission did not consider the conceivable nonmedical uses an immediate threat, it recommended the establishment of a body to watch future advances and protect against their misuse. But some interventions, as we have seen, are too dangerous to apply to humans, while others are distant or impossible. In particular, the possibilities for genetic control of behavior, as in Aldous Huxley's *Brave New World*, seem much more limited than those for the cure of monogenic diseases, both because behavioral traits are polygenic and because most genetically determined differences between individuals are laid down in the brain circuitry before birth.

It thus appears that a special continuing commission on genetic engineering might find itself watching only for developments that either are very distant or are too dangerous to try. If so, it would have little to do, and it might then be tempted to become a busybody, imposing federal restrictions on activities that are better regulated on the local scene. On the other hand, the existence of some mechanism for continuing surveillance of genetic engineering could have real value in protecting the public from unwarranted anxiety. Perhaps the best way to achieve this end, while avoiding undue interference, would be to assign the task not to a special body but to one with wider responsibilities for biomedical ethics.—BERNARD D. DAVIS, *Harvard Medical School, Boston, Massachusetts 02115*