

human nature as grounds for human rights, as essentially vulnerable, or as wonderfully fragile, will be inclined to see the possibility of changing these essential characteristics as a danger. In any case, the current debate presumes that unless we pass regulation to prevent it, a post-human future is just around the corner. I have tried to show here that the fears and hopes surrounding the demise of human beings in favor of a new species of post-humans are mistaken. This is so because such fears and hopes are grounded in an inadequate understanding of human biology. Both proponents and critics of genetic enhancement have erroneous presuppositions about the role of genes in human biology. Furthermore, they adopt incorrect beliefs about knowledge production in the biological sciences.

It is obvious that there are a variety of problems that surround many discussions of genetic enhancement. Many of these debates rarely pay attention to issues of what it means to be human, what human nature is, how much we can change human genetics without affecting “human nature,” or what it means to be what are called “better humans.” My focus here has been only on a different aspect of this debate: the failure to present a balanced view of what might or might not be possible as a result of genetic human enhancement and on the social, political, and ethical consequences of this lopsided debate.

Notice, however, that I have not attempted to deny that genetic technologies might prevent and cure some human diseases or that they might “enhance” some human characteristics. The aim of this chapter has been to point out that at least as far as present biological knowledge indicates, we have no reasons to believe that such genetic manipulations would be such as to give rise to a new species of post-humans. It is surprising that, in spite of current scientific evidence, most of the debate about the presumed consequences – good or bad – of genetic enhancement appears to ignore the complexity of human traits and behaviors. Despite such evidence, discussions of genetic enhancement continue to present genes as the main determinants of human traits, behaviors, or diseases. These discussions often disregard relationships between genes, epigenetic effects, the influence of the cellular environment on gene expression, and the effects of environmental and social factors on human biology and on our judgments about the desirability or undesirability of particular traits.

Notice also that my arguments are not a call to cease reflection on the topic of human nature or on the social context that makes the idea of human enhancement a reasonable scientific goal. Neither am I proposing that we stop thinking and discussing about whether, and if so how, our attempts to control human nature by means of genetic enhancement might affect human self-understanding. On the contrary, I believe that such reflections are badly needed if for no other reason than that they can be very useful in helping us to decide what kind of technologies we want by analyzing the kind of society that we want to construct.

It is in everybody’s interest to encourage thoughtful and informed evaluations of the ethical, legal, and social implications of new biomedical research and technologies. Conceptual issues, ethical principles, and political and social practices must be taken into account in performing such analyses. But equally important for many of these discussions is an adequate depiction of the power of scientific

research and a reasonable portrayal of the possibilities of human genetic enhancement. Paying careful attention to current research in human genetics and cell biology shows that many of the alleged urgent concerns about a post-human future seem to be misplaced.

References

- Agar, N., 2004, *Liberal Eugenics*, Blackwell, Malden, MA.
- Annas, G., Andrews, L., and Isasi, R., 2002, Protecting the endangered human: toward an international treaty prohibiting cloning and inheritable alterations, *Am. J. Law Med.* **28**(2–3):151–178.
- Becker, K. G., 2004, The common variants/multiple disease hypothesis of common complex genetic disorders, *Med. Hypo.* **62**(2):309–317.
- Bostrom, N., 2003, Human genetic enhancement: a transhumanist perspective, *J. Val. Inq.* **37**(4):493–506.
- Chakravarti, A., and Little, P., 2003, Nature, nurture and human disease, *Nature* **421**(6921):412–414.
- Cummings, M., 2003, *Human Heredity*, 6th ed., Thomson Learning, Pacific Grove, CA.
- Dennis, C., 2003, Epigenetics and disease: altered states, *Nature* **421**(6924):686–689.
- Dunar, A., and Waring, S., 1999, *Power to Explore*, NASA History Office, Washington, DC, 1999.
- Dupré, J., 2001, *Human Nature and the Limits of Science*, Oxford University Press, New York.
- Flegal, K. M., Graubard, B. I., Williamson, D. F., and Gail, M. H., 2005, Excess Deaths Associated With Underweight, Overweight, and Obesity, *JAMA* **293**(15):1861–1867.
- Fukuyama, F., 2002, *Our Posthuman Future: Consequences of the Biotechnology Revolution*, Farrar, Straus and Giroux, New York, NY.
- Gannett, L., 1997, Tractable genes, entrenched social structures, *Biol. and Phil.* **12**(3):403–419.
- Gard, M., 2005, *The Obesity Epidemic; Science, Morality and Ideology*, Routledge, New York.
- Gifford, F., 2002, Understanding genetic causation and its implications for ethical issues in human genetics, in: *Mutating Concepts, Evolving Disciplines: Genetics, Medicine, and Society*, R. Ankeny and L. Parker, eds., Kluwer Academic Publishers, Dordrecht, pp. 109–125.
- Gannon, W., 2002, Identity, prudential concern, and extended lives, *Bioethics* **16**(3):266–283.
- Habermas, J., 2003, *The Future of Human Nature*, Polity, Cambridge, UK.
- Han, P. K. J., 2002, Conceptual and moral problems of genetic and non-genetic preventive interventions, in: *Mutating Concepts, Evolving Disciplines: Genetics, Medicine, and Society*, R. Ankeny and L. Parker, eds., Kluwer Academic Publishers, Dordrecht, pp. 265–286.
- Harris, J., 2000, Essays on science and society: Intimations of immortality, *Science* **288**(5463):59.
- Harris, J., 2004, Immortal ethics, *Ann. N.Y. Acad. Sci.* **1019**:527–34.
- Hayflick, L., 2004, Anti-aging' is an oxymoron," *J. Gerontol. A Biol. Sci. Med. Sci.* **59**(6): B573–578.
- Hudson, J., 2000, What kinds of people should we create? *J. Appl. Phil.* **17**(2):131–143.
- Hughes, J., 2004, *Citizen Cyborg*, Westview Press, New York.
- Jiang, Y. H., Bressler, J., and Beaudet, A. L., 2004, Epigenetics and human disease, *Annu. Rev. Geno. Hum. Gen.* **5**:479–510.
- Kaplan, J., 2000, *The Limits and Lies of Human Genetic Research*, Routledge, New York.
- Kass, L., 2003, *Beyond Therapy: Biotechnology and the Pursuit of Happiness*, HarperCollins, New York.
- Kass, L. R., 2001, L'Chaim and its limits: why not immortality? *First Things* **113**:17–24.
- Miller, R. I., 2002, Extending life: scientific prospects and political obstacles, *Milb. Q.* **80**(1):155–174.