

where 50 per cent of one's genes come from, it can cause unhappiness.<sup>18</sup>

Chadwick then asks whether this problem can be avoided if only a small amount of genetic makeup is involved. Her answer is equivocal but on balance she seems to feel that "we must be cautious about producing a situation where children feel they do not really belong anywhere, because their genetic history is confused."<sup>19</sup> This sounds mild enough until we examine the cash value of phrases like "can cause unhappiness" or "be cautious" as Chadwick uses them.

In discussing the alleged unhappiness caused by ignorance of 50 per cent of one's genetic origin, Chadwick argued strongly that such unhappiness was so serious that "it seems wise to restrict artificial reproduction to methods that do not involve donation of genetic material. This rules out AID, egg donation, embryo donation and partial surrogacy."<sup>20</sup>

In elevating doubt about one's genetic origin to a cause of unhappiness so poignant that it would be better that a child who might experience it had never been born, Chadwick ignores entirely the (in fact false) truism that, while motherhood is a fact, paternity is always merely a hypothesis. It is a wise child indeed that knows her father and since such doubt might reasonably cloud the lives of a high proportion of the population of the world, we have reason to be sceptical that its effects are so terrible that people should be prevented from reproducing except where such doubt can be ruled out.

The effect of Chadwick's conclusion is to deny gay couples and single people the possibility of reproducing. Chadwick denies this, suggesting "they are not being denied the opportunity to have children. If they are prepared to take the necessary steps ('the primitive sign of wanting is trying to get') their desire to beget can be satisfied." What are we to make of this? It seems almost self-consciously mischievous. In the first place, gay couples and single women resorting to what must, *ex hypothesi*, be distasteful sex with third parties merely for procreational purposes, are unlikely to preserve the identity of their sexual partners for the benefit of their offspring's alleged future peace of mind. If this is right then doubt over genetic origin will not be removed. Since Chadwick is explicitly addressing public policy issues she

should in consistency advocate legislation against such a course of action rather than recommend it.

But surely, if we are to contemplate legislating against practices which give rise to doubt about genetic origins we would need hard evidence not only that such practices harm the resulting children but that the harm is of such a high order that not only would it have been better that such children had never been born but also better that those who want such children should suffer the unhappiness consequent on a denial of their chance to have children using donated genetic material?

Where such harm is not only unavoidable but is an inherent part of sexual reproduction and must affect to some degree or other a high percentage of all births, it is surely at best unkind to use the fear of it as an excuse for discriminating against already persecuted minorities in the provision of reproductive services.

Where, as in the case of gene therapy, such donated<sup>21</sup> material also protects life and health or improves the human condition, we have an added reason to welcome it.

#### NOTES

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1. The argument here follows that of my paper "Should We Attempt to Eradicate Disability," published in the Proceedings of the Fifteenth International Wittgenstein Symposium.
2. See my discussion of the difference between harming and wronging in my *Wonderwoman & Superman: The Ethics of Human Biotechnology* (Oxford, 1992), ch. 4.
3. This goes for relatively minor conditions like the loss of a finger or deafness and also for disfiguring conditions right through to major disability like paraplegia.
4. In this sense the definition of disability is like that of "poverty."
5. See my more detailed account of the relationship between harming and wronging in my *Wonderwoman & Superman* (Oxford: Oxford University Press, 1992), ch. 4.
6. Who should of course include us all.
7. Davis, "The Status of Anencephalic Babies: should their bodies be used as donor banks?" *Journal of Medical Ethics*, 14 (1988), p. 150.
8. See my *The Value of Life* (London: Routledge, 1985 and 1990), ch. 1 and my "Not all babies should be kept alive as long as possible" in Raanan Gillon and Anne Lloyd (eds.)

*Principles of Health Care Ethics* (Chichester: John Wiley, 1993).

9. I use the term "weak" here to echo Chadwick's use of the term. I take "genetically weak" to refer to those possessing a debilitating genetic condition or those who will inevitably pass on such a condition. All of us almost certainly carry some genetic abnormalities and are not thereby rendered "weak."

10. Here I borrow freely from my *Wonderwoman & Superman: The Ethics of Human Biotechnology* (Oxford University Press, 1992), ch. 9, where I discuss all these issues in greater depth than is possible here.

11. *Ibid.*

12. *Ibid.*, ch. 8.

13. For an elaboration on the importance of this distinction see my discussion of "the wrong of wrongful life" in *Wonderwoman & Superman*, ch. 4.

14. *Ibid.*, ch. 7.

15. *Report of the Committee on the Ethics of Gene Therapy*, presented to Parliament by Command of Her Majesty, January 1992. London HMSO para. 4. 22.

16. In fact intelligence is unlikely to prove responsive to such manipulation because of its multifactorial nature.

17. There would be analogous problems about attempts to block the use of gene therapy to change things like physical stature and height since it might be used in the treatment of achondroplasia or other forms of dwarfism.

18. Ruth Chadwick, *Ethics, Reproduction and Genetic Control* (London: Routledge, 1987), p. 126.

19. *Ibid.*, p. 127.

20. *Ibid.*, p. 39.

21. I use the term "donated" here, but I do not mean to rule out commerce in such genetic material. See my *Wonderwoman & Superman*, ch. 6.

## Genetic Enhancement

WALTER GLANNON

On the question of genetic enhancement, Glannon argues that a line of demarcation can be drawn between treatment and enhancement. Gene therapy is permissible if it is intended to ensure or restore normal functions, but it is morally illegitimate if it is aimed at enhancing functions beyond normal. He thinks there are several moral problems with enhancement, but his main moral concern is "that it would give some people an unfair advantage over others with respect to competitive goods like beauty, sociability, and intelligence."

Gene therapy must be distinguished from genetic enhancement. The first is an intervention aimed at treating disease and restoring physical and mental functions and capacities to an adequate baseline. The second is an intervention aimed at improving functions and capacities that already are adequate. Genetic enhancement augments functions and capacities "that without intervention would be considered entirely normal."<sup>1</sup> Its goal is to "amplify 'normal' genes in order to make them better."<sup>2</sup> In chapter 1 [of *Genes and Future People*], I cited Norman Daniels's definitions of health and disease as well as what the notion of just health care entailed. This involved maintaining or restoring mental and physical func-

tions at or to normal levels, which was necessary to ensure fair equality of opportunity for all citizens. Insofar as this aim defines the goal of medicine, genetic enhancement falls outside this goal. Furthermore, insofar as this type of intervention is not part of the goal of medicine and has no place in a just health care system, there are no medical or moral reasons for genetically enhancing normal human functions and capacities.

Some have argued that it is mistaken to think that a clear line of demarcation can be drawn between treatment and enhancement, since certain forms of enhancement are employed to prevent disease. LeRoy Walters and Julie Gage Palmer refer to the immune system as an example to make this point:

In current medical practice, the best example of a widely accepted health-related physical enhancement is immunization against infectious disease.

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With immunization against diseases like polio and hepatitis B, what we are saying is in effect, "The immune system that we inherited from our parents may not be adequate to ward off certain viruses if we are exposed to them." Therefore, we will enhance the capabilities of our immune system by priming it to fight against these viruses.

From the current practice of immunizations against particular diseases, it would seem to be only a small step to try to enhance the general function of the immune system by genetic means. . . . In our view, the genetic enhancement of the immune system would be morally justifiable if this kind of enhancement assisted in preventing disease and did not cause offsetting harms to the people treated by the technique.<sup>3</sup>

Nevertheless, because the goal of the technique would be to prevent disease, it would not, strictly speaking, be enhancement, at least not in terms of the definitions given at the outset of this section. Genetically intervening in the immune system as described by Walters and Palmer is a means of maintaining it in proper working order so that it will be better able to ward off pathogens posing a threat to the organism as a whole. Thus, it is misleading to call this intervention "enhancement." When we consider what is normal human functioning, we refer to the whole human organism consisting of immune, endocrine, nervous, cardiovascular, and other systems, not to these systems understood as isolated parts. The normal functioning in question here pertains to the ability of the immune system to protect the organism from infectious agents and thus ensure its survival. Any preventive genetic intervention in this system would be designed to maintain the normal functions of the organism, not to restore them or raise them above the norm. It would be neither therapy nor enhancement but instead a form of maintenance. Therefore, the alleged ambiguity surrounding what Walters and Palmer call "enhancing" the immune system does not impugn the distinction between treatment and enhancement.

If enhancement could make adequately functioning bodily systems function even better, then presumably there would be no limit to the extent to which bodily functions can be enhanced. Yet, beyond a certain point, heightened immune sensitivity

to infectious agents can lead to an overly aggressive response, resulting in autoimmune disease that can damage healthy cells, tissues, and organs. In fact, there would be a limit to the beneficial effects of genetic intervention in the immune system, a limit beyond which the equilibrium between humoral and cellular response mechanisms would be disturbed.<sup>4</sup> If any intervention ensured that the equilibrium of the immune system was maintained in proper working order, then it would be inappropriate to consider it as a form of enhancement.

To further support the treatment-enhancement distinction, consider a nongenetic intervention, the use of a bisphosphonate such as alendronate sodium. Its purpose is to prevent postmenopausal women from developing osteoporosis, or to rebuild bone in women or men who already have osteoporosis. Some might claim that, because it can increase bone density, it is a form of enhancement. But its more general purpose is to prevent bone fractures and thus maintain proper bone function so that one can have normal mobility and avoid the morbidity resulting from fractures. In terms of the functioning of the entire organism, therefore, it would be more accurate to consider the use of bisphosphonates as prevention, treatment, or maintenance rather than enhancement.

Some might raise a different question. Suppose that the parents of a child much shorter than the norm for his age persuaded a physician to give him growth hormone injections in order to increase his height. Suppose further that the child's shortness was not due to an iatrogenic cause, such as radiation to treat a brain tumor. Would this be treatment or enhancement? The question that should be asked regarding this issue is not whether the child's height is normal for his age group. Rather, the question should be whether his condition implies something less than normal physical functioning, such that he would have fewer opportunities for achievement and a decent minimum level of well-being over his lifetime. Diminutive stature alone does not necessarily imply that one's functioning is or will be so limited as to restrict one's opportunities for achievement. Of course, being short might limit one's opportunities if one wanted to become a professional basketball player. But most of us are quite flexible when it comes to formulating and carrying out life plans. Robert Reich, the treasury

secretary in President Clinton's first administration, is just one example of how one can achieve very much in life despite diminutive stature. If a child's stature significantly limited his functioning and opportunities, then growth-hormone injections should be considered therapeutic treatment. If his stature were not so limiting, then the injections should be considered enhancement.

Admittedly, there is gray area near the baseline of adequate functioning where it may be difficult to distinguish between treatment and enhancement. Accordingly, we should construe the baseline loosely or thickly enough to allow for some minor deviation above or below what would be considered normal functioning. An intervention for a condition near the baseline that would raise one's functioning clearly above the critical level should be considered an enhancement. An intervention for a condition making one's functioning fall clearly below the baseline, with the aim of raising one's functioning to the critical level, should be considered a treatment. For example, an athlete with a hemoglobin level slightly below the norm for people his age and mildly anemic may want to raise that level significantly in order to be more competitive in his sport. To the extent that his actual hemoglobin level does not interfere with his ordinary physical functioning, an intervention to significantly raise that level would be an instance of enhancement. In contrast, for a child who has severe thalassemia and severe anemia, with the risk of bone abnormalities and heart failure, an intervention to correct the disorder would be an instance of treatment.

The main moral concern about genetic enhancement of physical and mental traits is that it would give some people an unfair advantage over others with respect to competitive goods like beauty, sociability, and intelligence. . . . Enhancement would be unfair because only those who could afford the technology would have access to it, and many people are financially worse off than others through no fault of their own. Insofar as the possession of these goods gives some people an advantage over others in careers, income, and social status, the competitive nature of these goods suggests that there would be no limit to the benefits that improvements to physical and mental capacities would yield to those fortunate enough to avail themselves of the technology. This

is altogether different from the example of immune-system enhancement. There would be no diminishing marginal value in the degree of competitive advantage that one could have over others for the social goods in question and presumably no limit to the value of enhancing the physical and mental capacities that would give one this advantage. Not having access to the technology that could manipulate genetic traits in such a way as to enhance these capacities would put one at a competitive disadvantage relative to others who would have access to it.

Advancing an argument similar to the one used by those who reject the treatment-enhancement distinction, one might hold that competitive goods collapse the categorical distinction between correcting deficient capacities and improving normal ones. This is because competitive goods are continuous, coming in degrees, and therefore the capacities that enable one to achieve these goods cannot be thought of as either normal or deficient.<sup>5</sup> Nevertheless, to the extent that any form of genetic intervention is motivated by the medical and moral aim to enable people to have adequate mental and physical functioning and fair equality of opportunity for a decent minimum level of well-being, the goods in question are not *competitive* but *basic*. In other words, the aim of any medical intervention by genetic means is to make people better off than they were before by raising or restoring them to an absolute baseline of normal physical and mental functioning, not to make them comparatively better off than others. Competitive goods above the baseline may be continuous; but the basic goods that enable someone to reach or remain at the baseline are not. Given that these two types of goods are distinct, and that they result from the distinct aims and practices of enhancement and treatment, we can affirm that enhancement and treatment can and should be treated separately. We can uphold the claim that the purpose of any genetic intervention should be to treat people's abnormal functions and restore them to a normal level, not to enhance those functions that already are normal.

As I have mentioned, genetic enhancement that gave some people an advantage over others in possessing competitive goods would entail considerable unfairness. A likely scenario would be one in which parents paid to use expensive genetic technology

to raise the cognitive ability or improve the physical beauty of their children. This would give them an advantage over other children with whom they would compete for education, careers, and income. Children of parents who could not afford to pay for the technology would be at a comparative disadvantage. Even if the goods in question fell above the normal functional baseline, one still could maintain that such an advantage would be unfair. It would depend on people's ability to pay, and inequalities in income are unfair to the extent that they result from some factors beyond people's control.

We could not appeal to the notion of a genetic lottery to resolve the problem of fairness regarding genetic enhancement. For, as I argued in the last section [of *Genes and Future People*], such a lottery is better suited to meeting people's needs than their preferences, and enhancements correspond to people's preferences. Moreover, a lottery might only exacerbate the problem by reinforcing the perception of unfairness, depending on how losers in the lottery interpreted the fact that others won merely as a result of a random selection. One suggestion for resolving the fairness problem (short of banning the use of the technology altogether) would be to make genetic enhancement available to all. Of course, how this system could be financed is a question that admits of no easy answer. But the more important substantive point is that universal access to genetic enhancement would not be a solution. Indeed, the upshot of such access would provide a reason for prohibiting it.

Universal availability of genetic enhancement would mean that many competitive goods some people had over others would be canceled out collectively. The idea of a competitive advantage gradually would erode, and there would be more equality among people in their possession of goods. There would not be complete equality, however. Differing parental attitudes toward such goods as education could mean differences in the extent to which cognitive enhancement was utilized. Some parents would be more selective than others in sending their children to better schools or arranging for private tutors. So, there still would be some inequality in the general outcome of the enhancement. But quite apart from this, the process of neutralizing compet-

itive goods could end up being self-defeating on a collective level.<sup>6</sup> More specifically, one probable side-effect of boosting children's mental capacity on a broad scale would be some brain damage resulting in cognitive and affective impairment in some of the children who received the genetic enhancement. The net social cost of using the technology would outweigh any social advantage of everyone using it. If no one is made better off than others in their possession of social goods, but some people are made worse off than they were before in terms of their mental functioning, then the net social disadvantage would provide a reason for prohibiting collective genetic enhancement.

There is another moral aspect of enhancement that should be considered. I have maintained that inequalities above the baseline of normal physical and mental functioning are of no great moral importance and may be neutral on the question of fairness. Although equality and fairness are closely related, one does not necessarily imply the other. Again, fairness pertains to meeting people's needs. Once these needs have been met, inequalities in the possession of goods relating to preferences are not so morally significant. Thus, if the idea of an absolute baseline implies that people's basic physical and mental needs have been met, and if people who are comparatively better or worse off than others all have functioning at or above the baseline, then any inequalities in functioning above this level should not matter very much morally. If this is plausible, then it seems to follow that there would be nothing unfair and hence nothing morally objectionable about enhancements that made some people better off than others above the baseline. Nevertheless, this could undermine our belief in the importance of the fundamental equality of all people, regardless of how well off they are in absolute terms. Equality is one of the social bases of self-respect, which is essential for social harmony and stability.<sup>7</sup> Allowing inequalities in access to and possession of competitive goods at any level of functioning or welfare might erode this basis and the ideas of harmony and stability that rest on it. Although it would be difficult to measure, this type of social cost resulting from genetic enhancement could constitute another reason for prohibiting it.

Yet, suppose that we could manipulate certain genes to enhance our noncompetitive virtuous traits,

such as altruism, generosity, and compassion.<sup>8</sup> Surely, these would contribute to a stable, well-ordered society and preserve the principle of fair equality of opportunity. Nothing in this program would be incompatible with the goal of medicine as the prevention and treatment of disease. But it would threaten the individual autonomy essential to us as moral agents who can be candidates for praise and blame, punishment and reward. What confers moral worth on our actions, and indeed on ourselves as agents, is our capacity to cultivate certain dispositions leading to actions. This cultivation involves the exercise of practical reason and a process of critical self-reflection, whereby we modify, eliminate, or reinforce dispositions and thereby come to identify with them as our own. Autonomy consists precisely in this process of reflection and identification. It is the capacity for reflective self-control that enables us to take responsibility for our mental states and the actions that issue from them. Given the importance of autonomy, it would be preferable to have fewer virtuous dispositions that we can identify with as our own than to have more virtuous dispositions implanted in us through genetic enhancement. These would threaten to undermine our moral agency because they would derive from an external source.<sup>9</sup> Even if our genes could be manipulated in such a way that our behavior always conformed to an algorithm for the morally correct course of action in every situation, it is unlikely that we would want it. Most of us would rather make autonomous choices that turned out not to lead to the best courses of action. This is because of the intrinsic importance of autonomy and the moral growth and maturity that come with making our own choices under uncertainty. The dispositions with which we come to identify, imperfect as they may be, are what make us autonomous and responsible moral agents. Enhancing these mental states through artificial means external to our own exercise of practical reason and our own process of identification would undermine our autonomy by making them alien to us.

In sum, there are four reasons why genetic enhancement would be morally objectionable. First, it would give an unfair advantage to some people over others because some would be able to pay for expensive enhancement procedures while others

would not. Second, if we tried to remedy the first problem by making genetic enhancement universally accessible, then it would be collectively self-defeating. Although much competitive unfairness at the individual level would be canceled out at the collective level, there would be the unacceptable social cost of some people suffering from adverse cognitive or emotional effects of the enhancement. Third, inequalities resulting from enhancements above the baseline of normal physical and mental functioning could threaten to undermine the conviction in the fundamental importance of equality as one of the bases of self-respect, and in turn social solidarity and stability. Fourth, enhancement of noncompetitive dispositions would threaten to undermine the autonomy and moral agency essential to us as persons.

## NOTES

1. Jon Gordon, "Genetic Enhancement in Humans," *Science* 283 (March 26, 1999): 2023-2024.
2. Eric Juengst, "Can Enhancement Be Distinguished from Prevention in Genetic Medicine?" *Journal of Medicine and Philosophy* 22 (1997): 125-142, and "What Does Enhancement Mean?" in Erik Parens, ed., *Enhancing Human Traits: Ethical and Social Implications* (Washington, DC: Georgetown University Press, 1998): 27-47, at 27. Also, Dan Brock, "Enhancements of Human Function: Some Distinctions for Policymakers," *Ibid.*, 48-69.
3. *The Ethics of Human Gene Therapy* (New York: Oxford University Press, 1997), 110. Instead of distinguishing between treatments and enhancements, Walters and Palmer distinguish between health-related and non-health-related enhancements. But I do not find this distinction to be very helpful.
4. Brock points this out in "Enhancements of Human Function," 59. Marc Lappe makes a more compelling case for the same point in *The Tao of Immunology* (New York: Plenum Press, 1997).
5. Kavka develops and defends the idea that competitive goods are continuous in "Upside Risks: Social Consequences of Beneficial Biotechnology," in Carl Cranor, ed., *Are Genes Us? The Social Consequences of the New Genetics* (New Brunswick, NJ: Rutgers University Press, 1994): 155-179, at 164-165.
6. Kavka, "Upside Risks," 167. Also, Brock, "Enhancements of Human Function," 60; and Buchanan et al., *From Chance to Choice* (New York: Cambridge University Press, 2000), chap. 8.
7. Rawls makes this point in *A Theory of Justice* (Cambridge, MA: Harvard Belknap Press, 1971), 7-11, and in "Social Unity