

Human Growth Hormone and the Measure of Man

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In July 2003, the Food and Drug Administration (FDA) authorized pharmaceutical companies to promote human Growth Hormone (hGH) for use in children who are very short but not suffering from any specific illness or medical condition. Parents are now using hGH in record numbers, hoping that hormone treatment will give their kids happier childhoods and more prosperous adulthoods. No one should doubt these parental good intentions. But the normalization of height enhancement reflects a troubling disposition, familiar in our time, to redefine disadvantageous traits as “illnesses” and look to medical techniques for a “cure.” Of course, there are often real benefits to using medical technologies for self-improvement: straighter teeth, clearer complexions, firmer figures. But our technological enhancements to body and psyche may also undermine those human goods that are less obvious but more fundamental—especially parental love for the abnormal child and civic love for the abnormal neighbor. We can hardly expect the FDA as an institution to worry about such matters; its concern is the safety of products not the health of the culture. But when it approved height enhancement for healthy kids, the FDA made a mistake on our behalf. Exploring the nature of this error may help us deal more wisely with the biotechnical enhancements of the future, or at least see more clearly the full meaning of our “improvements.”

The Burdens of Shortness

One can understand the hGH seduction. Short Americans—especially males—often face difficulties ranging from fitting in at school to finding a job or spouse. Studies show that shortness in childhood is correlated with juvenilization, teasing, bullying, and social exclusion, while studies in adults have linked short stature to social isolation, reduced marriage rates, and problems in employment. In one study, several hundred university students rated the qualities of men of varying heights. Short men were regarded as less mature, less positive, less secure, less masculine, less

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successful, less capable, less confident, and less outgoing. Other studies confirm the link between stature and job opportunities. Given two résumés designed with equivalent qualifications, recruiters decided to hire the taller candidate fully three-quarters of the time. People holding high-ranking positions are about two inches taller on average than those in lower-ranking positions who have comparable education and aptitude test scores. When relevant factors are controlled for, average earnings rise about one percent for each additional inch of height.

Today, parents with short children and large pocketbooks can choose whether to accept the social and economic disadvantages their kids may encounter on account of their shortness. A chemical protein that influences linear growth in children, hGH is Miracle-Gro for kids, adding an average of 2 to 4 inches onto a child's expected adult height. Almost any child who undergoes hormone treatment in sufficient quantity and for sufficient time will grow faster in the short-term and taller in the long-term, regardless of the cause of the child's short stature or the level of his natural growth hormone secretion. Hormone patients inject hGH into the abdomen 12 to 14 times per week over a period of 3 to 7 years before the age of 20, at a cost of roughly \$10,000 to \$20,000 per year. According to clinical trials conducted by Eli Lilly, medical risks associated with hormone treatments are negligible, with side effects limited to joint pain and mild ear infections.

When hormone treatment was first used in the 1950s, the quantity of available human growth hormone was limited to what could be extracted from the pituitary glands of human cadavers. Given the narrowly fixed supply, treatment was restricted to children who could not produce growth hormone on their own. But in the mid-1980s, the genetic engineering of synthetic hGH—virtually identical to the growth hormone produced naturally—expanded the supply of hGH exponentially. At first, the use of hGH still focused on treating growth hormone deficiency alone. By the mid-1990s, however, the FDA had awarded patents to Genentech and Eli Lilly to market synthetic hGH to the few thousand non-growth hormone deficient (GHD) children in the U.S. whose short stature was associated with other medical problems, such as achondroplasia (dwarfism), Turner Syndrome, or Chronic Renal Insufficiency. Genentech and Eli Lilly also sought to expand the hGH market to include short but otherwise healthy children, who suffer from no stature-stunting diseases, disabilities, or deficiencies. These children simply have genes for shortness in their family trees.

The pharmaceutical companies argued that it was unfair to allow treatment for children who are deficient in growth hormone while forbidding treatment for equally short children who secrete growth hormone normally. Consider, in this regard, an example adapted from a 1990 article by David B. Allen and Norman C. Fost in the *Journal of Pediatrics*: Nate and Carl are two hypothetical 9-year-old boys. Both stand exactly 3 standard deviations below the mean height and growth rate for their age in America. Both are predicted to reach a final adult height of 5 feet. Nate's short stature results from a brain tumor that has left him deficient in growth hormone secretion. Carl secretes growth hormone normally. His short stature results simply from genes he inherited from his short parents. On what grounds can we justify making Nate eligible for treatment but not Carl? Carl bears no more responsibility for his small size than Nate: in both cases, shortness was an equally unchosen result of the natural lottery. All else being equal, both will encounter the same grade school taunting and dating drawbacks as a result of their shortness. In each case, the desire for hormone treatment is an equally reasonable response to a social world that often prefers tall people to short people.

Indeed, many bioethicists see no morally relevant difference between Nate and Carl when it comes to whether they should receive growth hormone treatment. As Allen Buchanan, Dan W. Brock, Norman Daniels, and Daniel Wikler write in *From Chance to Choice: Genetics and Justice*, "there is something 'morally arbitrary' about addressing the disadvantages produced by disease and impairment and not addressing those imposed by disadvantageous—but normal—allotments of capabilities." Many pediatric endocrinologists apparently agreed, and in the late 1980s they began prescribing hormone treatment for non-diseased, non-growth hormone deficient children, even though such "off-label" use had not been approved by the FDA for promotion by the pharmaceutical industry. It is likely that the inconvenience of multiple daily injections over a long period of time and the high cost of hormone treatment will act, for now, as deterrents to casual use. But it is also clear that hGH is being used more and more widely by those who are not sick but just short. By 1996, short healthy children already accounted for nearly half of all hGH patients, and synthetic hGH had become one of the 25 most profitable pharmaceuticals in the country, banking over \$500 million in annual sales.

In a sense, the FDA's recent decision simply codified existing practice. It gave Eli Lilly explicit permission to market its hGH treatment Humatrope for use by healthy children whose height falls more than 2.25

standard deviations below the national mean for age and sex. This cut-off corresponds to roughly the shortest one percentile of children—that is, those with a projected adult height under 5 feet, 3 inches for boys and under 4 feet, 11 inches for girls. While short stature can pose physical difficulties in the home, workplace, or stores—tables, chairs, shelves, switches, staircases, water fountains, pay phones, and supermarket shelves are designed for people of average height—the disparate height criterion according to gender suggests that the justification for treatment was not overcoming a functional handicap. Men and women do not, after all, climb different staircases or use different light switches.

The FDA reasoned instead that shortness owing to any cause is evidence of a dysfunction in the physiological system that normally produces height. The FDA effectively redefined shortness from a variation of normality to a deficiency of height genes. What began in the 1950s as an attempt to correct a demonstrable physiological problem has now become a “treatment” for shortness as such, on the grounds that shortness is by nature an “illness” or “dysfunction.” Any among the 900,000 very short boys and girls in the United States today are now automatically eligible for hGH injections, even if their shortness is due merely to having short parents. The transition from therapeutic to cosmetic uses of endocrinology foreshadows a parallel shift beyond therapy if biotechnology one day allows us to modify human traits heretofore considered normal. “[O]nce the door is opened for ‘healing’ short people,” predicts physician Mark Groshek, “we may face increasing pressure to fix or change more and more things that are simply human characteristics and not illnesses.”

Intentions and Consequences

The FDA’s decision about hGH thus raises broader questions about the moral meaning of practices that aim to enhance human traits: If healthy children are eligible for treatment, what reason is there to limit the use of hGH to those whose height falls below a certain arbitrary cut-off? Why not allow height enhancement for all shorter-than-average children? If there is no good reason to restrict treatment to those who suffer from a distinct physiological deficiency, why not treat the child of average or even above-average height who thinks that a few extra inches will help his chances at making the basketball team? And if we permit height enhancement for healthy children, on what grounds could we justify a moral prohibition on the biotechnical enhancement of other normal traits—such as appearance, strength, mood, memory, or intelligence?

The use of hGH for enhancement falls somewhere between the familiar (like cosmetic surgery) and the futuristic (like genetic engineering of offspring). Height enhancement is more like facelifts, breast augmentation, and liposuction in the sense that it will not pass down to the children of those who are treated. But the use of hGH is more like genetic engineering in the sense that the alterations are more than skin deep. Growth hormone treatment changes people at the cellular and molecular level. The injection of chemical proteins to increase the secretion of growth hormone alters the biological processes governing height.

Clearly, one of the driving forces behind hGH is the burden of being short relative to one's peers—the burden of being in the bottom one percentile. But the irony of the FDA's decision, if it were perfectly implemented, is that it would prove collectively self-defeating. Treating the bottom one percent of children will never get rid of a lowest one percent in society; it will just shift the statistical classification and accompanying burden of relative shortness to others. Because height is distributed unevenly in any population, as some become taller, others become shorter relative to the average. If hGH gives the shortest one percent of children two to three inches of added height, these children will grow taller than the next few percentiles, causing the previously next-to-shortest kids to drop down to the lowest one percent, making them potentially eligible for treatment to increase height. If hGH use became widespread, those who do not enhance their height will find themselves shorter in relation to their hormone-treated peers, and might feel pressured to seek treatment just to catch up. After several generations, the original height distribution might eventually return, with the entire height distribution curve moved upward. Where the point was to increase height relative to others, the purpose of treatment would have failed, while the hormonal arms race took its toll on the medical resources and pocketbooks of private or public payers.

Alternatively, many people worry that the high cost of hGH treatment means that only some children will receive the advantages of hGH, and that the gap between the wealthy and the disadvantaged will grow even wider. A pediatric endocrinologist's opinion is a prerequisite for growth hormone treatment, so only those with the resources to access these specialized physicians can qualify for height enhancement. Among families able to obtain an endocrinologist's recommendation, many would still be unable to pay for the treatment. In 2000, the median household income in the U.S. was \$42,148, while the average annual cost of multi-year hGH treatment was \$10,000 to \$20,000, which is not (as yet) covered by insurance.

Of course, the inequality problem could be resolved, at least in theory, if hGH treatment were provided by the state as an entitlement. If height enhancement were seen as an essential human good, wealthy societies could act to ensure that it was available to all who needed or desired it. Such a policy is unlikely, certainly in the United States. But worries about equal access, while genuine, do not get at the heart of the problem with height enhancement *in itself*. Many large questions remain: Is our disquiet with height enhancement *intrinsic* to the activity or a *prudential concern* about its likely social effects? Does height enhancement hurt society because it is not universally available, or does it diminish precisely those individuals with the financial means to engage in it?

Perhaps the issue is not the dangers of inequality so much as the attitudes of narrow-mindedness and unrestrained control that height enhancement seems to embody. If heightism is unjust—systemic, pervasive, and stereotyping—is it possible to “enhance away” shortness without becoming complicit in injustice? Surely parents of short-statured children—many short themselves—do not believe that short people are any less valuable by virtue of their shortness. They simply want their children to experience the range of opportunities open to children of normal height. The fact that parents do not *intend* to send a hurtful message, however, does not change the fact that their short children might see height enhancement as a form of rejection rather than compassion. Imagine if parents in the age of Jim Crow could biologically lighten the complexion of a black child to make him “more white.” The parents might do this out of love, believing that white people have more opportunities in a racist society. And they might know in their hearts that black people are really equal to white people. But by choosing whiteness and rejecting blackness, they would perpetuate discrimination whether they mean to or not.

After all, the meaning of an activity emerges as a function of context, not simply intention. Given medicine’s prominent societal status, enlisting the profession’s services for height enhancement sanctions the idea that all short people are sick. Although the risks associated with growth hormone are minimal, the invasive nature of the treatment and the appearance of risk associated with any medical procedure send the message that the objective of taller children is a worthy and important goal, and that being short is unacceptable and undesirable.

Of course, height enhancers could speak out against heightism, while still relieving short children of the burden of growing up short. Like the activist who protests unjust conditions in the inner city but heads for the

suburbs to escape urban crime, it is possible to denounce injustice and also shield oneself from it. While this course of action balks at an opportunity for symbolic protest through self-sacrifice, it is also a reasonable response to the burdens of living in an unjust society.

In the case of height enhancement, however, the effort to seek a better life for one's offspring comes with a potentially grave cost: inflicting psychological damage on the child in the very act of trying to "cure" him. Each injection of hGH is a reminder of inadequacy. While the decision to pursue height enhancement is driven by the desire to help one's child flourish, the aspiration for taller offspring conveys dissatisfaction with the healthy child's normal capacity for growth. Unlike disabling traits like blindness, paraplegia, and Down syndrome, which inherently limit the range of human capacities and opportunities, short stature poses disadvantages because of the way shortness is regarded in a society that prizes height. Even though the parental motivation for height enhancement is to avoid the disadvantages of their child's shortness, the attempt to modify the child's non-disabling trait nevertheless feeds the child's worry that his parents find him flawed and deficient.

When parents act on the desire to select their children's traits, it may send the message that the family is like a club, in which membership is contingent on the demonstration of desirable features. It teaches the lesson that children must meet certain eligibility criteria in order to make the grade for parental cherishing. This lesson may instill feelings of profound anxiety in children, who rarely question the content of parental love, questioning instead their own sense of personal adequacy. And when hormone treatment does not meet the parent's hopes of increased height, the child may feel responsible for failing to satisfy parental expectations for growth.

Guardians or Gardeners?

Recall the two equally short boys: Nate, whose short stature results from a brain tumor that has left him deficient in growth hormone, and Carl, whose shortness results from healthy genes inherited from his short parents. The reason we treat Nate is not because hormone treatment would relieve the suffering that accompanies his short stature in a society that prizes height. We treat Nate because hormone therapy ameliorates a discrete physiological problem. Children whose pituitary glands secrete a deficient level of growth hormone are also susceptible to GHD-related problems in renal function, blood pressure, hair growth, and sexual maturation and function; medical conditions related to GHD support the idea

that a non-deficient level of growth hormone is a part of what it means to flourish as a physiologically healthy human being. Though hormone treatment for GHD children increases final adult stature, it isn't really enhancement at all, in the sense that it does not increase, augment, improve, or modify any trait beyond a state of normal human functioning for a particular individual. Treatment for Nate merely fulfills his healthy growth capacity—bestowed on him, perhaps, by genetically tall parents—by restoring the level of hGH that was taken from him by his hormone-depleting brain tumor. Hormone treatment for the GHD child acts in service to and cooperation with his nature by realizing his given potential for growth, unimpeded by the disease or deficiency that deforms and corrupts his native endowment.

Enhancing Carl's height does not serve this healing function. Hormone treatment for non-GHD children does not tend to their unique potential for height, as given perhaps by genetically short parents. Treating Carl with growth hormone to boost his below-average but otherwise healthy stature neither makes him more whole biologically speaking nor serves his naturally given inclinations. "In contrast to hGH deficiency, in which a clear abnormality—a deficit—is replaced," writes pediatric endocrinologist Peter Hindmarsh, the use of growth hormone in non-GHD children "does not involve hormone replacement, but rather the addition of more hGH in an already replete individual." Enhancing Carl's height would bring him closer to the statistical population norm for height, but *beyond* the norm for health. Treating Carl requires ignoring or overriding his healthy capacity for growth and subordinating his given nature to his parents' own projects, however well-intentioned.

But recognizing this fact does not settle the matter. The activity of parenthood does not aim simply at maintaining the child's biological functions, but also at cultivating the child's experiential possibilities. The proper scope of parental influence is surely not limited to the protection of health, while letting a child's talents lie fallow or shortcomings remain unaddressed. Parents must guide their child toward what they consider the most fitting vision of the good life, while maintaining a disposition of openness toward those traits that are given by nature. The invocation of nature here does not resign us blindly to accept whatever happens in the absence of human intervention. It is not an objection to "unnatural" or "artificial" practices as such, or to the enormous blessings of the medical enterprise. It is an appeal, instead, to regard the rearing of children as a balance between accepting them as they are and shaping them into what

we hope they might become. And this is why *health* is an important standard, if never the highest aspiration: To ignore the physical health of one's child is a betrayal, but to medicalize abnormal traits as unhealthy endangers the norms of parental love. It might lessen our capacity to live well with human difference. It might turn us into a society that rejects short people out of sympathy for short people, and that only and always seeks the "statistical average."

Ethicist William Ruddick writes that parents play a tricky dual role as "guardians and gardeners." Parents are guardians in the sense that they tolerate, celebrate, or encourage the inclinations or possibilities toward which children are directed by birth. Parents are gardeners in the sense that they reject and repair destructive tendencies and promote their children's flourishing by helping them realize the various excellences of which they are capable. Guarding alone is too passive, too quietistic; gardening alone is too demanding, too overbearing. Only a careful balancing of these complementary dispositions makes it possible for parents to tend appropriately to children's unique needs, interests, and gifts.

Wise parents remain open to the possibility that certain undesired features of their child—at first glance just a nuisance—might later reveal themselves as the key to something meaningful. As the ethicist John Lachs asks: What do we typically regard as our imperfections? "The little mole above the curl of lip that makes a woman's smile mysterious? The tendency to dream that leads to surprising inventions and enterprises? The habits of excess that lurk behind great achievements?" The traits parents target for alteration may turn out to be the scourge they suspected, worthless or damaging and in need of correction. But parents may also discover that the very abnormality that was once so tempting to eliminate is actually inseparable from genuine virtues.

For short people, the ability to stretch out with ample legroom on airplane flights or obtain discount movie tickets late into adolescence hardly qualify as valuable in this sense. What *may* be valuable, however, is the oft-neglected appreciation for diversity that is endangered by flushing out physical differences such as shortness, where the justification for doing so is not the restoration of health. In a society that places significant emphasis on people's height, those with short stature are perceived from childhood as identifiable others. As a result, short people are well-situated to deal with and grow from their extended encounter with narrow-mindedness on the playground and beyond. Researchers point to this enduring experience with intolerance as the principal reason that short

people demonstrate unusually high levels of empathy, compassion, and sensitivity. (Of course, some short people react in precisely the opposite way—seeking to make up for their short stature by imposing their inflated will on others. But if the psychological data are to be believed, the Napoleons are in the minority.)

Forced to cultivate self-respect and self-esteem in their short-statured otherness, short people often become unusually accepting of difference in themselves and others. While it would be a profound mistake to romanticize the adversity faced by short people, it would also be a mistake to undervalue short people's special sensitivity to difference in others. This receptivity to the multiplicity of human forms is precarious in a time when suspect norms of appearance are enforced through powerful advertising campaigns and thriving markets for cosmetics. Enhancements that promise to reduce prejudice-induced suffering by flushing out every human abnormality lead to what literary critic Leslie Fiedler calls a "surgically, chemically, hormonally induced and preserved normality." The result is a society without toleration or excellence—a society ruled by "the tyranny of the normal."

The Limits of Autonomy

This insight—the dangers of undermining parental love and diminishing our tolerance for difference—still leaves many unanswered questions. Is there a difference between biological enhancements (like hGH) and environmental enhancements (like praise and blame, musical instruction, or athletic training)? And what is the moral significance of *living within* rather than *living beyond* one's own healthy human functioning? Isn't the desire to be "better than well" a *natural* desire?

Jürgen Habermas—one of the few liberal philosophers to criticize genetic engineering—tries to distinguish between biological and non-biological enhancements by pointing to the diminished capacity of engineered offspring for moral agency. He fears that genetic enhancements may uniquely bias young children toward some life plans over others, encroaching on the child's "right to an open future," as Joel Feinberg put it. In traditional child-rearing practices, children can "retroactively" free themselves through a process of "critical reappraisal" and "revisionary learning." They can overcome the limits that parental choices place on them as they seek to live their lives as they choose. But "genetic programming," Habermas contends, provides no similar occasion for adolescents to reclaim authorship over their own lives.

At first glance, Habermas's distinction between *biological* and *pedagogical* enhancements accounts for what may be misguided about practices like hGH treatment for healthy children. It seems plausible that "genetic fixation" might permanently compromise a child's freedom in a way that "restrictive socialization processes" would not. But Habermas's distinction fails to appreciate the complexity of the ways in which children's capacities for intelligence, musicality, and athleticism, among other traits, are embedded and developed. Our heredity and environment work together to equip us for and direct us toward some pursuits over others. Habermas overstates the role of nature and understates the role of nurture in the sense relevant for individual autonomy. Genetic intervention does not necessarily prevent the possibility of revolt, and environmental intervention does not necessarily guarantee it.

But even if it is true that biological influences *do* fix a child's capacities and direction more decisively than non-biological influences, there are three reasons why Habermas's argument from autonomy would still fail to account for what is misguided about practices like height enhancement.

First, the autonomy objection implies that children who do not undergo hormone treatment or genetic engineering can choose *for themselves* how tall they wish to become. But in reality, if a child's stature were not determined by a parent's choice to pursue height enhancement, his height would simply be left to random genetic recombination. Designing parents do not rob designed children of choices they would otherwise possess; they simply fix their child's range of choices in a different way.

Second, because height is an all-purpose trait—useful across a range of life plans and valued across a range of cultural perspectives—height enhancement would not limit the available pursuits from which hormone-treated children could choose. Growing taller might prevent short children from a few marginal activities, such as becoming a horse jockey. But the extra inches would also open up an array of social and economic opportunities, ranging from better chances at romance to greater professional income. Even if children *could* choose for themselves how tall they wish to be, having others make this decision on their behalf would not infringe on their capacity to choose among various visions of the good life. Indeed, one could argue that height enhancement expands the range of choices for the child, opening more life options than it closes.

Finally, Habermas's autonomy objection fails to account for the disquiet some people feel when adults choose height enhancement for themselves. Though hGH treatment works to boost stature only in young

children, a surgical procedure available in China is capable of increasing height in adults, and one can imagine non-surgical techniques for adults becoming available in the not-too-distant future. These procedures would not pass down enhanced height to the patient's future offspring; they would affect height only in the individual patient, the autonomous chooser himself.

But the disquiet that lingers suggests that the loss of autonomy is not the only problem with height enhancement; the problem goes deeper. As much as we prize the virtues of self-determination, living well with human difference requires accepting certain limits to autonomy. It requires a willingness to tolerate one's own abnormalities as the very ground for accepting the abnormalities of others. Short people may have fewer life choices than tall people, and society may never overcome its biases. But short people can still choose the meaning they give to being short, seeking out the types of excellence or empathy that their abnormality directly or indirectly makes possible. As Eric Cohen put it, invoking one of the most wonderful abnormal characters in Western literature:

Today, Cyrano de Bergerac could get a nose job to improve his romantic prospects. He has more choices in the age of cosmetic surgery; he has greater autonomy, at least as we usually understand it. But acting on this autonomy in the present might come at the cost of his nobility in the future. After all, Cyrano's bravado and courage and eloquence were inseparable from his effort to live well with the gross difference that nature imposed on him. If his large nose made it harder for him to breathe, his parents would be irresponsible not to find a doctor who might restore him to health. But a large nose in itself is not a sickness, just an abnormality. And there is perhaps a certain wisdom in living the life our unique nature imposes on us, even if doing so requires discerning what to change about ourselves and what to accept, what is freedom and what is fate.

Perhaps Cyrano would have been happier simply to have been "normal." But we would have lost a greatness and sensitivity of soul that would have lessened all of us.

The Costs of Mastery

It is surely true that biological enhancement cannot be so easily distinguished from some of the familiar ways that parents shape their children's lives. But the moral resemblance between low-tech and high-tech enhancements is not a reason to resign ourselves to generations of

growth hormone-treated offspring. It is instead a reason to question the overly ambitious child-rearing techniques to which we have become accustomed. Tacking inches onto healthy children for the sake of prom dates and playing time is an aggressive attempt to satisfy society's demand for successful children and superior achievement, untempered by that aspect of parental love which accepts and affirms children as they are. As an extreme if not unique expression of the spirit of mastery that pervades contemporary culture, the practice of height enhancement leads us yet further toward a world in which parents regard their children more as projects they design than gifts they receive.

At stake in the struggle between "openness" and "mastery" is not only the loving relationship between parents and children, but also society's awareness of the contingency that marks our human traits and life fortunes. As Michael Sandel recently argued in the *Atlantic Monthly*, child-rearing practices like growth hormone treatment promote an attitude of willful command that wears away our attentiveness to how chance influences the way our lives turn out. When we replace the hand nature dealt us with the one our parents bought for us, we may lose touch with the *given* character of human capacities. The unequal distribution of prized traits such as height may come to be seen less as a matter of bad luck than of poor decision-making. As the contingent nature of our lot in life fades, so too may the social basis for our commitment to moral solidarity. If we no longer have reason to reflect on the sense of life as a gift, we may find ourselves ill-equipped to adopt a charitable moral posture toward those who are different from us or less well off than we are. By freeing ourselves from the constraints of nature and chance we bear in common, we might free ourselves from the feeling that we share a common fate with one another. In the end, the pervasive quest for enhancement might diminish us all.