nature genetics

Treatment or treats?

"Something strange is happening in American medicine. No longer is it being used merely to cure illness. Medicine is now being used in the pursuit of happiness." Carl Elliott, in The Guardian, 26 August 2003

Should we make an ethical, rather than simply a market, distinction between treatments and enhancements? A treatment is designed to bring an individual with an extreme condition into the normal range, toward the mean. In contrast, an enhancement is aimed toward or beyond the most desirable extreme in the population. Before claiming that new drugs will enhance the human population in disastrous directions, we should try regularly to re-evaluate who is better off, since advertising, changing expectations, and new discoveries in pharmacogenetics (the study of the ways in which genes influence the efficacy of drugs) will rapidly change the context in which health is assessed.

First, an extra burden falls on the ill, because illness is often not understood until effective intervention becomes available. Worse, members of our own societies may turn away from those affected, only to return to sympathetic understanding when therapy is available. This happened for infection with microorganisms causing syphilis and AIDS, examples that provide a point of reference for discussing genetic disease, because the genes one inherits and passes on link loved ones in a similarly intimate way. Indeed, the history of overt genetic disease has sometimes involved similar kinds of social reaction in times of greater fear and ignorance than is the case today.

What happens to our view of health and disease when genetic diagnosis and therapy become available to help those with the physiques of jockeys, basketball players and sumo wrestlers toward the 'all-rounder' norm? In this issue, Christine Dos Santos and colleagues (page 720) found that short children carrying a shorter variant of the human growth hormone receptor grew faster in response to growth hormone therapy than did short children with a longer form of the receptor. Recently, in the US and Europe, children born small, and the hundreds of thousands of children who are the shortest for their age, have become eligible for growth hormone therapy. As much as half of the European population has one or more copies of the gene variant that results in faster growth in response to treatment. This difference in drug response is an example of the importance of pharmacogenetics. The study also raises interesting questions, such as how people with different ancestry will respond, and when stature should be considered a condition to be treated. This last point is particularly important as most short people are not deficient in growth hormone itself.

Often, technological progress may not feel progressive because we recognize largely the need for improvements over our new quality of life. But it is in this new environment that serious diseases may receive the attention they deserve for the first time. A good example of this is obesity, which is a homeostatically defended condition, a form of re-regulation at high body mass. Fat defends a metabolic system with substantially different priorities to those of the decision-maker who inhabits that body. Numerous studies document the actuarial risk for most of the common diseases in those with a body mass index over 30 kg m^{-2}. Former FDA commissioner David Kessler commented at the BIO 2004 conference on 6 June 2004 on the need to regard excess body fat as a disease and a cause of morbidity and mortality in its own right. Its environmental causes must primarily be tackled socially, because it often affects the poorest in lands of abundant produce. Still, as Michael Schwartz emphasized at the same meeting, understanding the obese body genetically and pharmacologically presents many opportunities for treatment.

Alarm at expanding waistlines has been sounded, with many physicians calling for obesity prevention by all the genetic and environmental means available. In the context of the above discussion, 'normal' body mass index is rapidly becoming an extreme, an ideal target of enhancement technology, rather than a societal average toward which we aim to treat a few 'diseased' individuals. This sounds to us like a case for treatment, rather than for treats. ■