

/EDITORIAL 2003

# Biotechnology, Ethics, and Society

DANIEL J. KEVLES

10

CELEBRATING  
A DECADE OF  
EXCELLENCE

Biotechnology has prompted serious social and ethical apprehension since the 1970s when debate erupted over the potential hazards to public health and safety of using the then-new technique of recombinant DNA with bacteria. The debate had originated with molecular biologists, who, responding to unease with their profession, organized a conference to consider the subject that was held in 1975 in Asilomar, California. It was soon widely predicted in the lay press and the halls of legislatures that a new era of genetic intervention was at hand: Plants, animals, and perhaps even human beings would be genetically manipulated—and some prognosticators vociferously insisted that horrific consequences would follow that ranged from environmental damage to a revival of eugenics.

Forced to submit to severe governmental restrictions on recombinant research, many budding biotechnologists came to regret that the issue of hazards had ever been raised in the first place. Even after the restrictions eased, they tended to dismiss the critics' warnings about the extension of genetic engineering to higher organisms as mere fear mongering, calling the prognostications—for the most part rightly—exercises in scientific fantasy and as such unworthy of ethical or regulatory consideration.

Yet today, almost twenty years later, some genetic technologies are yielding transgenic plants and animals while others are rendering the human genetic dictionary ever more readable. Indeed, the rapid progress of biotechnology combined with its deep commercial involvements since the seventies has, if anything, added fuel to lay suspicions of genetic engineering as an enterprise of dangerous hubris. Consider only Michael Crichton's best-selling novel *Jurassic Park*, which will be released this year as a major film directed by Stephen Spielberg: Toward the end of Crichton's page-turner, the intricately designed zoo of genetically resurrected dinosaurs runs out of control. Malcolm Hammond, the conscience of the novel, remarks as he lies dying from a raptor attack: "Science, like other outmoded systems, is destroying itself. As it gains in power, it proves itself incapable of handling the power."

Hammond's is partly an old indictment: For at least a century critics have proclaimed that science as a body of knowledge has no moral values—while excellent at addressing questions about what is, it is powerless to deal with questions about what ought to be. Yet while scientific knowledge is inherently amoral, the scientific enterprise expresses implicit moral judgments—judgments made by societies and institutions in deciding which fields of research to support (or not to prohibit); and by individual scientists in choosing

what they will or will not work on. Biotechnology is inherently moral to the degree that it acts in accord with the virtually unanimous social conviction that it is ethical, for example, to find therapies for human disease and disorder or to increase the world's food supply.

However, the ethical challenges attributed to the increasing power of biotechnology are all hardly fantasies. Quite the contrary. A growing number are tangibly real and already pressing upon us. For example, the torrent of human genetic information emerging from the human genome project poses challenges to systems and values of social decency. Employers may seek to deny jobs to applicants with a susceptibility—or an alleged susceptibility—to disorders such as manic depression or illnesses arising from features of the workplace. Insurance companies may well propose to adjust or deny coverage on the basis of the genomic signatures of their clients, their profile of risk for disease and death. Even national health systems might choose to ration the provision of care on the basis of genetic propensity for disease, especially to families at risk for bearing diseased children.

Biotechnologists, no better at ethics than any other class of human beings, ought not to be held responsible for all the ethical problems that their work creates. However, they do have a responsibility—because their technical expertise specially equips them for it—to help society handle the powers that the advance of genetic technology is providing. During the 1970s debates on recombinant DNA, molecular biologists sensibly contended that regulation should not be triggered by how a product—say a pharmaceutical—is produced but by whether the product itself poses a hazard. It is thus regrettable that now some biotechnologists want to break that rule, holding that even the product—for example, a bioengineered tomato—does not merit regulatory oversight even though it differs from the natural food.

It would be unfortunate if public confidence in biotechnology were to be undermined by suspicions that biotechnologists attach greater importance to commercial interest than to considerations of public health and safety. Now that the products of biotechnology are beginning to spread broadly into the consumer economy, it will take only a few serious mishaps to have the Jeremy Rifkins of the world writing the rules. Regulation is probably a dirty word in many sectors of the biotechnology community, but governmental oversight is one of the principal means by which society makes its ethics operational—and allays its fears. It makes sound social sense for biotechnologists to help create appropriate codes of law to control the diversifying powers of biotechnology. And in the end, good ethics may prove to be good business.

*Daniel J. Kevles is J.O. and Juliette Koepfli Professor of the Humanities at California Institute of Technology in Pasadena. He is a coeditor, with Leroy Hood, of The Code of Codes: Scientific and Social Issues in the Human Genome Project. The views expressed here are the author's own and not necessarily those of Bio/Technology.*