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**chapter 2**

# **Introduction**

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The United States stands at the brink of a new scientific revolution that could change the lives and futures of its citizens as dramatically as did the Industrial Revolution two centuries ago and the computer revolution today. This new revolution is based on advances in molecular biology that permit the identification, alteration, and transfer of genetic materials that control fundamental characteristics of organisms. The ability to manipulate genetic material to achieve specified outcomes in living organisms (and in some cases their offspring) promises major changes in many aspects of modern life.

At one level, this biotechnology revolution has already occurred. The methods in basic research for identifying genetic instructions, altering them, and transferring the revised instructions to a new organism are established and tested. At another level, however, the biotechnology revolution is imminent but not yet a reality. Only a few products made through recombinant DNA technology have reached the marketplace. The first successful human application of genetic manipulation for therapeutic ends (human gene therapy) has yet to occur. Environmental applications of genetically engineered organisms have only begun to enter the field-test phase. Consequently, widespread commercial uses of genetically engineered products that could revolutionize American life have not yet happened.

Decisions made by the Federal Government will affect the timing, direction, and impact of this technological revolution. Several Federal agencies are responsible for regulating the applications of these new biotechniques. The National Institutes of Health and the Food and Drug Administration (FDA) will oversee the approval process for clinical trials of human gene therapy and develop the regulations for subsequent therapeutic applications. FDA also regulates other biological and pharmaceutical products produced by these new technologies. The Environmental Protection Agency has the responsibility for considering the environmental and ecological impacts of the environmental release of genetically altered micro organisms. The

U.S. Department of Agriculture oversees the certification of agricultural products, including those that will be produced by genetic manipulation.

The opinions and perceptions of the U.S. populace towards the variety of uses of biotechnology and genetic engineering are important components in the Federal role of managing these technologies. In order to assess the public's opinions about science and technology in general—and biotechnology and genetic engineering in particular—the Office of Technology Assessment commissioned Louis Harris & Associates to conduct a survey to gauge citizens' responses to a full range of scientific and technological opportunities, limitations, and consequences of recent biological developments. This background paper describes the results from the survey; it does not discuss the policy implications of the data.

After defining the scope of the study, focus group discussions were held with samples of the public on October 8 and October 9, 1986 to investigate what people thought about the issues on OTA's agenda. Based on a review of the available public opinion research in this field and informed by the results of the focus groups, a survey questionnaire was developed. The survey instrument was pretested on October 16, 1986. The pretest identified areas of difficulty for either interviewer or respondent, and the findings were used to modify the questionnaire. Details of survey methodology appear in appendix A, and the final survey instrument is reproduced in appendix B.

The survey was administered to a national cross-sectional sample of the adult population of the United States, in order to permit projections to the total population. The OTA survey of public perceptions of science, genetic engineering, and biotechnology was conducted between October 30 and November 17, 1986. A total of 1,273 telephone interviews was completed. The characteristics of achieved survey samples typically differ from population estimates due to population non-coverage (nontelephone households) and differential response rates. Consequently, the achieved

sample was weighted to Census estimates by education, age, sex, and race. **All survey findings are presented as weighted sample estimates. The unweighed sample base is presented in the tables so that the sampling variance for these estimates can be calculated** This variance depends, in part, on the sample size. For those

instances in the survey when results for the total sample (1,273) are reported, the variance is +/- 2 to 3 percent.<sup>1</sup>

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<sup>1</sup>For a recent review article on survey accuracy see P.E. Converse and M.W. Traugott, "Assessing the Accuracy of Polls and Surveys," *Science* 234:1094-1098, 1986.