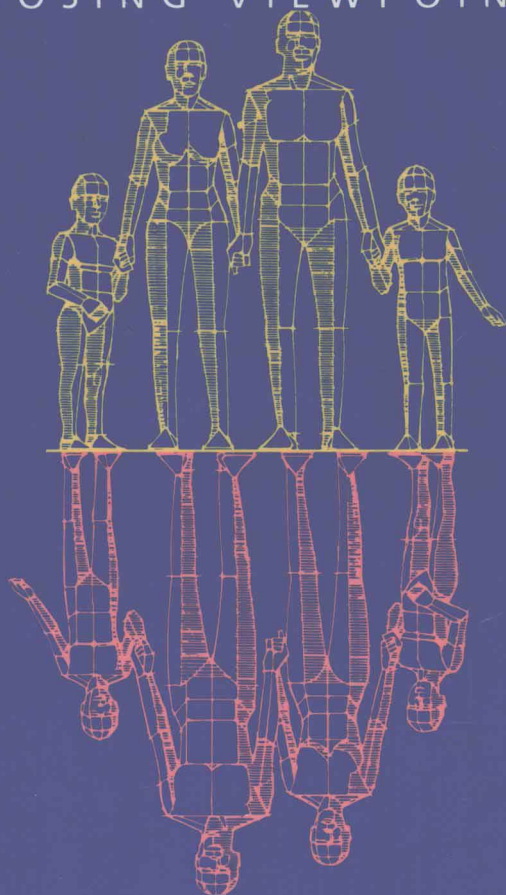


# GENETIC ENGINEERING

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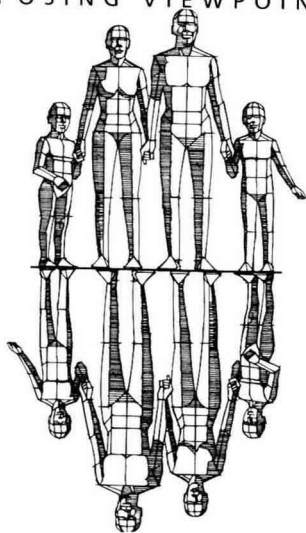


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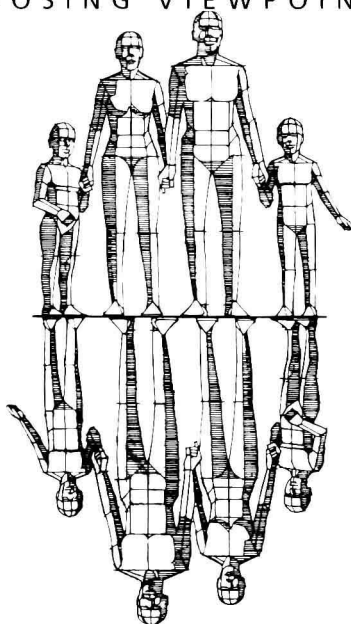
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# GENETIC ENGINEERING

OPPOSING VIEWPOINTS<sup>®</sup>



David L. Bender & Bruno Leone, *Series Editors*

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"Congress shall make no law . . .  
abridging the freedom of speech,  
or of the press."

First Amendment to the US Constitution

The basic foundation of our democracy is the first amendment guarantee of freedom of expression. The *Opposing Viewpoints Series* is dedicated to the concept of this basic freedom and the idea that it is more important to practice it than to enshrine it.

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# Why Consider Opposing Viewpoints?

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*"It is better to debate a question without settling it than to settle a question without debating it."*

Joseph Joubert (1754-1824)

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## **The Importance of Examining Opposing Viewpoints**

The purpose of the Opposing Viewpoints Series, and this book in particular, is to present balanced, and often difficult to find, opposing points of view on complex and sensitive issues.

Probably the best way to become informed is to analyze the positions of those who are regarded as experts and well studied on issues. It is important to consider every variety of opinion in an attempt to determine the truth. Opinions from the mainstream of society should be examined. But also important are opinions that are considered radical, reactionary, or minority as well as those stigmatized by some other uncomplimentary label. An important lesson of history is the eventual acceptance of many unpopular and even despised opinions. The ideas of Socrates, Jesus, and Galileo are good examples of this.

Readers will approach this book with their own opinions on the issues debated within it. However, to have a good grasp of one's own viewpoint, it is necessary to understand the arguments of those with whom one disagrees. It can be said that those who do not completely understand their adversary's point of view do not fully understand their own.

A persuasive case for considering opposing viewpoints has been presented by John Stuart Mill in his work *On Liberty*. When examining controversial issues it may be helpful to reflect on this suggestion:

The only way in which a human being can make some approach to knowing the whole of a subject, is by hearing what can be said about it by persons of every variety of opinion, and studying all modes in which it can be looked at by every character of mind. No wise man ever acquired his wisdom in any mode but this.

### **Analyzing Sources of Information**

The Opposing Viewpoints Series includes diverse materials taken from magazines, journals, books, and newspapers, as well as statements and position papers from a wide range of individuals, organizations and governments. This broad spectrum of sources helps to develop patterns of thinking which are open to the consideration of a variety of opinions.

### **Pitfalls to Avoid**

A pitfall to avoid in considering opposing points of view is that of regarding one's own opinion as being common sense and the most rational stance and the point of view of others as being only opinion and naturally wrong. It may be that another's opinion is correct and one's own is in error.

Another pitfall to avoid is that of closing one's mind to the opinions of those with whom one disagrees. The best way to approach a dialogue is to make one's primary purpose that of understanding the mind and arguments of the other person and not that of enlightening him or her with one's own solutions. More can be learned by listening than speaking.

It is my hope that after reading this book the reader will have a deeper understanding of the issues debated and will appreciate the complexity of even seemingly simple issues on which good and honest people disagree. This awareness is particularly important in a democratic society such as ours where people enter into public debate to determine the common good. Those with whom one disagrees should not necessarily be regarded as enemies, but perhaps simply as people who suggest different paths to a common goal.

### **Developing Basic Reading and Thinking Skills**

In this book, carefully edited opposing viewpoints are purposely placed back to back to create a running debate; each viewpoint is preceded by a short quotation that best expresses the author's main argument. This format instantly plunges the reader into the midst of a controversial issue and greatly aids that reader in mastering the basic skill of recognizing an author's point of view.

A number of basic skills for critical thinking are practiced in the activities that appear throughout the books in the series. Some of

the skills are:

*Evaluating Sources of Information* The ability to choose from among alternative sources the most reliable and accurate source in relation to a given subject.

*Separating Fact from Opinion* The ability to make the basic distinction between factual statements (those that can be demonstrated or verified empirically) and statements of opinion (those that are beliefs or attitudes that cannot be proved).

*Identifying Stereotypes* The ability to identify oversimplified, exaggerated descriptions (favorable or unfavorable) about people and insulting statements about racial, religious or national groups, based upon misinformation or lack of information.

*Recognizing Ethnocentrism* The ability to recognize attitudes or opinions that express the view that one's own race, culture, or group is inherently superior, or those attitudes that judge another culture or group in terms of one's own.

It is important to consider opposing viewpoints and equally important to be able to critically analyze those viewpoints. The activities in this book are designed to help the reader master these thinking skills. Statements are taken from the book's viewpoints and the reader is asked to analyze them. This technique aids the reader in developing skills that not only can be applied to the viewpoints in this book, but also to situations where opinionated spokespersons comment on controversial issues. Although the activities are helpful to the solitary reader, they are most useful when the reader can benefit from the interaction of group discussion.

Using this book and others in the series should help readers develop basic reading and thinking skills. These skills should improve the reader's ability to understand what they read. Readers should be better able to separate fact from opinion, substance from rhetoric and become better consumers of information in our media-centered culture.

This volume of the Opposing Viewpoints Series does not advocate a particular point of view. Quite the contrary! The very nature of the book leaves it to the reader to formulate the opinions he or she finds most suitable. My purpose as publisher is to see that this is made possible by offering a wide range of viewpoints which are fairly presented.

David L. Bender  
Publisher



# Introduction

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*"The tools of molecular biology have enormous potential for both good and evil. Lurking behind every genetic dream come true is a possible Brave New World nightmare."*

Philip Elmer-Dewitt, *Time*, March 20, 1989.

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Genetic engineering encompasses several techniques developed within the last two decades which manipulate and alter the genes found in the cells of living organisms. Genetic engineering has turned heredity—the passing of inheritable characteristics from parent to offspring—from a natural, random event into a process that can be artificially controlled and exploited. It has the potential to give humanity unprecedented power over life itself, and its use has thus raised profound questions in such diverse areas as the environment, agriculture, biological warfare, and animal rights.

Ironically, one of the sharpest controversies involves a scenario that has yet to exist: the genetic engineering of humans. Present genetic engineering technology is limited to plants, bacteria, and some animals. Two events in 1989, however, point to a time when that could change. In January, the United States launched the Human Genome Project, a multi-billion-dollar research program under the direction of James D. Watson. The project's goal, expected to take years to complete, is to discover and map all of the estimated 100,000 genes found in every human cell. A second milestone occurred in May 1989 when a National Institutes of Health medical team led by Steven Rosenberg genetically altered human cells and injected them into a patient. The experiment marked the first time genetic engineering was applied directly to humans.

Both events foreshadow a future which many people believe will feature the genetic manipulation of humans. This prospect has drawn a variety of responses. Watson and other proponents argue that genetic engineering can help correct genetic defects and prevent suffering and death. Some forecast more drastic developments. Science lecturer Brian Stableford envisions a future in which humans are genetically altered for space travel and underwater living. "Until now, we have had to be content with the image in which evolution has shaped us," he writes. "Soon,

we will have the capacity to remake that image in any way we choose." Science writers Sharon and Kathleen McAuliffe agree: "The human species as we know it may be replaced by a new bionic animal that controls its own evolution."

Many people, however, find these ideas profoundly unsettling and even immoral. Critics question both the utility and the value of genetic engineering. Some, such as V. Elving Anderson, question human genetic engineering for religious reasons: "Is it right to monkey with the genetic makeup that we assume was placed in us by an omniscient God?" Further objections have been raised by controversial activist Jeremy Rifkin, who asks, "Do we want our children to grow up in a world where the genetic codes of plants, animals, and humans are interchangeable and living things are programmed as engineered products with no greater intrinsic value than autos or microwave ovens?" Rifkin and others argue that the price of exploiting genetic engineering could be the cheapening of life and the loss of what it means to be human.

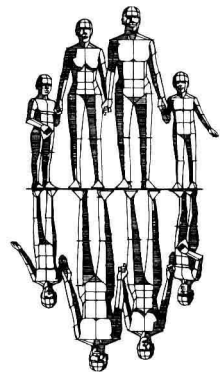
No one can predict when and if the genetic redesigning of humans will become a reality. But debating the questions raised by this and other aspects of genetic engineering becomes ever more crucial. The topics considered in *Genetic Engineering: Opposing Viewpoints* include the following: Is Genetic Engineering Beneficial? Can Genetic Engineering Improve Health? Does Genetic Engineering Improve Agriculture? Is Genetic Engineering Adequately Regulated? Will Genetic Engineering Lead to a Biological Arms Race? Underlying all the debates is the question: Can the cleverness which led to the discovery of genetic engineering be matched by wisdom in using it?

# 1 CHAPTER

## Is Genetic Engineering Beneficial?

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### GENETIC ENGINEERING





# Chapter Preface

Most participants in the debate over genetic engineering would agree with the statement that genetic engineering carries the *potential* for both good and harm. Most proponents, for example, would concede that it is theoretically possible for genetically altered microbes to become environmental hazards, and most opponents would agree that genetic engineering could be used to develop vaccines to many diseases. Where they often disagree is in their confidence in the governments and corporations that govern genetic engineering. Proponents generally assume that genetic engineering can be developed to maximize its positive potential and minimize its harm. Critics have doubts as to whether such development is possible.

The viewpoints in this chapter debate whether genetic engineering is beneficial and whether humans are ready for it.