

**genome (jē'nōm), n.**  
**all the genetic material**  
**in the chromosomes of**  
**an organism.**

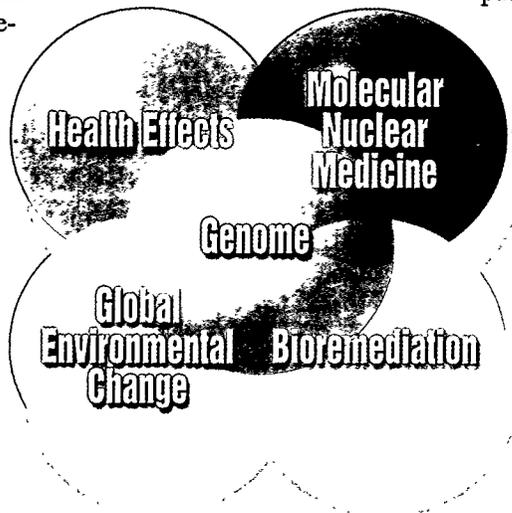
**N**ow completing its first decade, the Human Genome Program of the U.S. Department of Energy (DOE) is the longest-running federally funded program to analyze the genetic material—the genome—that determines an individual's characteristics at the most fundamental level. Part of the Biological and Environmental Research (BER) Program sponsored by the DOE Office of Biological and Environmental Research (OBER\*), the genome program is a major component of the larger U.S. Human Genome Project.

Since October 1990, the project has been supported jointly by DOE and the National Institutes of Health (NIH) National Human Genome Research Institute (formerly National Center for Human Genome Research). Together, the DOE and NIH components make up the world's largest centrally coordinated biology research project ever undertaken.

The U.S. Human Genome Project is a 15-year endeavor to characterize the human genome by improving existing human genetic maps, constructing physical maps of entire chromosomes, and ultimately determining a complete sequence of the deoxyribonucleic acid (DNA) subunits. Parallel studies are being carried out on selected model organisms to facilitate interpretation of human gene function.

\*In 1997 the Office of Health and Environmental Research (OHER) was renamed Office of Biological and Environmental Research (OBER).

The ultimate goal of the U.S. project is to identify the estimated 70,000 to 100,000 human genes and render them accessible for future biological study. A complete human DNA sequence will provide physicians and researchers in many biological disciplines with an extraordinary resource: an "encyclopedia" of human biology obtainable by computer and available to all.



*For 50 years, programs in the DOE Office of Biological and Environmental Research have crossed traditional research boundaries in seeking new solutions to energy-related biological and environmental challenges (see Appendix F, p. 95, and <http://www.er.doe.gov/production/ober/ober.html>).*

Obtaining the complete sequence by 2005 will require a highly coordinated and focused international effort generating advances in biological methodology; instrumentation (particularly automation); and computer-based methods for collecting, storing, managing, and analyzing the rapidly growing body of data.

## Project Origins

The potential value of detailed genetic information was recognized early; until recently, however, obtaining this information was far beyond the capabilities of biomedical research. DOE OBER and its two predecessor agencies—the Atomic Energy Commission and the Energy Research and Development Administration—had long sponsored genetic research in both microbial and higher systems. These studies included explorations into population genetics; genome structure, maintenance, replication, damage, and repair; and the consequences of genetic mutations. These traditional DOE activities evolved naturally into the Human Genome Program.

