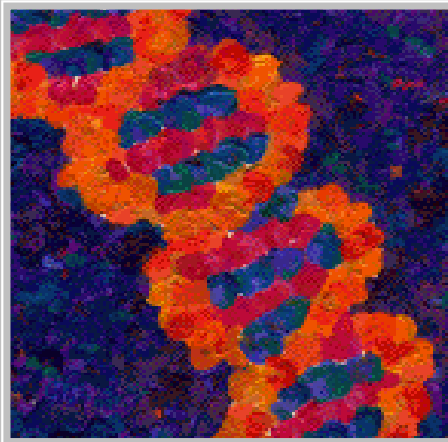




Human Genome Breakthrough

The completion of the human genome sequence is known by scientists, creating an historical and medical breakthrough within the dynamics of disease amongst mankind. No doubt, the controversy involving ethics and the social ramifications are heated and debatable. The World over is involved in the continuous research of perfecting the human genome sequence breakthrough. This article will only scratch the surface of the controversial modern day miracle of "Human Genome and DNA Sequencing". Further voluminous readings are available regarding this topic, internationally and in the U.S., some links are in the text.



What is the Human Genome Project?

Begun formally in 1990, the U.S. [Human Genome Project](#) is a 13-year effort coordinated by the [U.S. Department of Energy](#) and the [National Institutes of Health](#). The project originally was planned to last 15 years, but rapid technological advances have accelerated the expected completion date to 2003.

Project "Human Genome" are to:

- ④ identify all the approximately 30,000 genes in human DNA,
- ④ determine the sequences of the 3 billion chemical bases that make up

human DNA,

- ④ store this information in databases,
- ④ develop faster, more efficient sequencing technologies,
- ④ develop tools for data analysis, and
- ④ address the ethical, legal, and social issues (ELSI) that may arise from the project.

To help achieve these goals, researchers also are studying the genetic makeup of several nonhuman organisms. These include the common human gut bacterium *Escherichia coli*, the fruit fly, and the laboratory mouse.

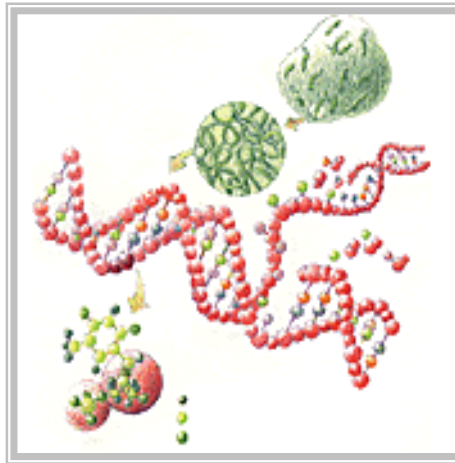
A unique aspect of the U.S. Human Genome Project is that it is the first large scientific undertaking to address the ELSI implications that may arise from the project.

What's a genome?

- ④ The complete set of instructions for making an organism is called its genome. It contains the master blueprint for all cellular structures and activities for the lifetime of the cell or organism. Found in every nucleus of a person's many trillions of cells, the human genome consists of tightly coiled threads of deoxyribonucleic acid (DNA) and associated protein molecules, organized into structures called chromosomes (<http://www.ornl.gov/hgmis/resource/media.html>).
- ④ DNA is made up of four similar chemicals (called bases and abbreviated A, T, C, and

G) that are repeated millions or billions of times throughout a genome. The human genome, for example, has 3 billion pairs of bases.

Ⓢ The particular order of As, Ts, Cs, and Gs is extremely important. The order underlies all of life's diversity, even dictating whether an organism is human or another species such as yeast, rice, or fruit fly, all of which have their own genomes and are themselves the focus of genome projects. Because all organisms are related through similarities in DNA sequences, insights gained from nonhuman genomes often lead to new knowledge about human biology (<http://www.ornl.gov/hgmis/resource/media.html> - benefits).



Questions and Answers from "USA Today" on March 27, 2001, following the announcement of the completion of the human genome sequence.

Q: What is the latest news about the human genome?

A: Researchers who have been mapping out the human genome - one group funded by the government, the other from a private corporation - formally and simultaneously published their work in two prestigious scientific journals. Publication puts the formal scientific stamp of approval on finished research.

Q: Didn't they announce last summer that they had finished the work?

A: Yes. And the scientists from both groups have been making their data available since. The federally funded researchers had been putting decoded pieces of genome on the Internet for other researchers to see; the private corporation sells subscriptions to its information, and is making it available free of charge as well.

Q: So are they done now?

A: No. Neither group considers its work complete. What was announced last summer was the completion of a "working draft" of the genome, covering about 90 percent of the map. The federally funded researchers hope to have a complete map by April 25, 2003, the 50th anniversary of the discovery of DNA.

Q: Then what's important about this new announcement?

A: Both groups actually looked at their map to see what was in it, once they figured out where most everything was. They have come up with an estimate of the number of human genes - no one ever had known that number before - and found that the "junk" DNA and other genomic elements they once thought were useless actually are very important.

Q: How many genes do we have?

A: It is just an estimate so far, but between 25,000 and 35,000. The government paper puts the number at 31,000; the private corporation, Celera Genomics, says about 26,000. That is far fewer than most scientists had expected. To

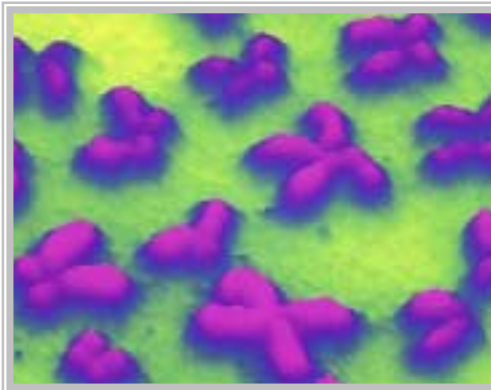
Arabidopsis thaliana.

Insights from Dr. Francis Collins, and J. Craig Venter:

"We have caught the first glimpse of our own instruction book, previously known only to God," said Dr. Francis Collins, the University of Michigan professor. "Historians will consider this a turning point," continued Collins, director of the National Human Genome Research Institute.

The genome's decoding will someday:

- Tell doctors who is likely to get what inherited illnesses.
- Enable researchers to eradicate many diseases and improve the treatment of many others.
- Provide people with genetic maps telling them what diseases they have to worry about.
- "There's at least the potential to reduce the number of cancer deaths to zero during our lifetimes," said J. Craig Venter, president of "Celera Genomics". The current U.S. cancer death rate is 2,000 a day. (University of Michigan, 2001)



Genome Celebration in June

The People's Genome Celebration weekend will be held June 8-10 at the Hyatt Regency Washington, on Capitol Hill and the Smithsonian Institution in conjunction with the Genetic Alliance's

annual conference. The weekend will celebrate the mapping of the human genome as a victory not just for scientists but for all people. Through dynamic, timely speeches and discussions, the event will spotlight the importance of genetics for understanding and managing health and disease in the 21st century and will open dialogue about critical and promising issues. Call (202-966-5557), for information, or log on at:(info@geneticalliance.org). Be a part of history in the making....

Ethical issues were left out of this factual article about genome research. Go to <http://www.ornl.gov/hgmis/elsi/elsi.html>, for readings concerning the ethical and social issues/pros and cons of human genome research and experimentation. The opinion of the writer considers the time staking efforts of scientists to discover an historical and revolutionary breakthrough in medical technology, the miracle to eradicate cancer, Alzheimer's, diabetes, and the endless list of diseases, that can now be annihilated.

Send your comments concerning "Human Genome Breakthrough" to "Border Voices" at bec@nmsu.edu. Border Voices was designed to hear and listen to your voice concerning the articles discussed at this website.

"Border Voices"

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