

# The Human Genome Project

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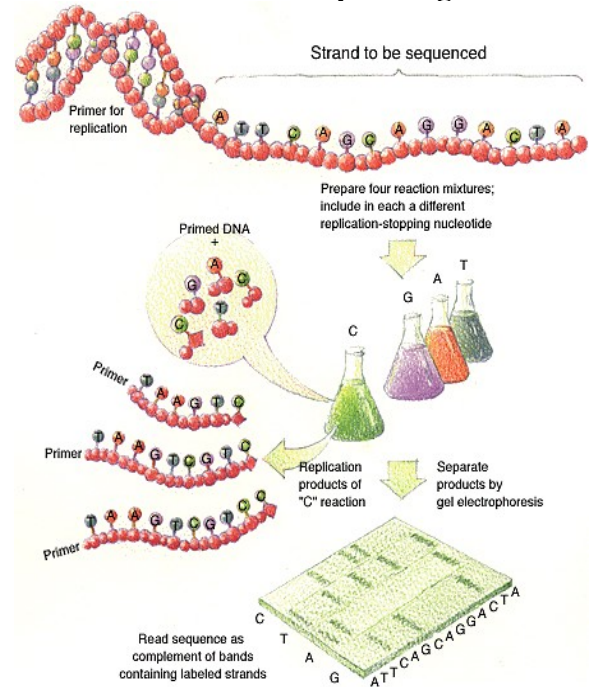
## The Genome Sequencing Reaction

A **genome** is all the DNA in an organism, including its genes. Genes carry information for making all the proteins required by all organisms. These proteins determine, among other things, how the organism looks, how well its body metabolizes food or fights infection, and sometimes even how it behaves. 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 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 etc.

The **Human Genome Project** was started in 1990, in an effort to find 100,000 or more human genes and determine the sequence of the 3-billion DNA base pairs. It was originally a 15 year project, and was cosponsored by the Department of Energy (DOE) and National Institute of Health (NIH), however with the help of technology, the goal was completed in 2003.

Project goals were to :

- *identify* all the approximately 20,000-25,000 genes in human DNA.
- *determine* the sequences of the 3 billion chemical base pairs that make up human DNA,
- *store* this information in databases.
- *improve* tools for data analysis,
- *transfer* related technologies to the private sector, and
- *address* the ethical, legal, and social issues (ELSI) that may arise from the project.



### Benefits:

#### **In the field of Medicine:**

- Improved diagnosis of disease
- Rational Drug design.

#### **In the field of Microbial Genomics:**

- New Energy sources.
- Safe/Efficient Environmental Remedies.

#### **In Agriculture:**

- Disease, insect and drought resistant crops.
- Healthier animals.
- Edible vaccines incorporated in foods.

### Ethical, Legal and Social Issues related to the project

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- Privacy and confidentiality issues.
- Clinical Issues.
- Health and environmental issues.
- Commercialization of Products.
- Fairness in the use of genetic information
- Reproductive Issues.

1. [http://www.ornl.gov/sci/techresources/Human\\_Genome/home.shtml](http://www.ornl.gov/sci/techresources/Human_Genome/home.shtml)

2. <http://www.genome.gov/> 3. <http://www.sanger.ac.uk/HGP/>