



# Education Resources at the NCBI

National Center for Biotechnology Information ■ National Library of Medicine ■ National Institutes of Health ■ Department of Health and Human Services

Established in 1988 as a national resource for molecular biology information, NCBI creates public databases, conducts research in computational biology, develops software tools for analyzing genome data, and disseminates biomedical information - all for the better understanding of molecular processes affecting human health and disease. Accessible from the NCBI home page is the Education Resources site, which provides a comprehensive repository of education resources available from the NCBI, including training opportunities and online tutorials on the NCBI's services:

[www.ncbi.nlm.nih.gov/Education/index.html](http://www.ncbi.nlm.nih.gov/Education/index.html)

## Training Opportunities



NCBI's [A Field Guide to GenBank® and NCBI Molecular Biology Resources](#), a lecture and hands-on computer workshop on GenBank and related databases covering effective use of the Entrez databases and search service, the BLAST® similarity search engine, genome data and related resources. Topics covered in the course include:

[GenBank Database: description and scope](#) ■ [NCBI Derivative Databases: RefSeqs Database Searching using Entrez](#) ■ [NCBI Structures Database Similarity Searching using NCBI BLAST](#) ■ [Genomic Resources at NCBI](#)

The course is offered at the National Library of Medicine (NLM) on the NIH campus in Bethesda, Maryland, in addition to other domestic and international locations.

## Mini Courses



In addition to the traditional Field Guide course, other types of training opportunities are available, such as the [NCBI MiniCourses](#). NCBI bioinformatics mini-

courses are either problem based, such as "Identification of Disease Genes" or NCBI resource based such as "BLAST Quick Start". The courses are two hours in length with the first hour devoted to an overview that is followed by a one hour hands-on session. Although, primarily given on the NIH campus, NCBI is beginning to offer the mini-courses at extramural institutions as well. The full listing of the mini-courses covers:

[Making Sense of DNA and Protein Sequences](#) ■ [LocusLink QuickStart](#)  
[Unmasking Genes in the Human Genome](#) ■ [Structural Analysis QuickStart](#)  
[Identification of Disease Genes](#) ■ [Map Viewer QuickStart](#)  
[Correlating Disease Genes and Phenotypes](#) ■ [GenBank QuickStart](#)  
[BLAST QuickStart](#) ■ [GenBank and PubMed Searching](#)

Librarians interested in learning an overview of search systems available at NCBI can attend the three-day Introduction to Molecular Biology and Information Resources course. This course reviews many NCBI services and search systems by combining lectures, demonstrations, and hands-on experience.

For more information on the NCBI Field Guide and other teaching resources, please contact the NCBI Help desk at [info@ncbi.nlm.nih.gov](mailto:info@ncbi.nlm.nih.gov).

## Online Tutorials, Text-based learning tools and a Science Primer

Basic understanding of the fundamentals of molecular biology is essential to utilizing the available resources offered at the NCBI. Thus, for persons interested in gaining primary knowledge of the science behind the bioinformatics, the NCBI has developed the Science Primer:

[www.ncbi.nlm.nih.gov/About/primer/index.html](http://www.ncbi.nlm.nih.gov/About/primer/index.html)

**A Science Primer**  
National Center for Biotechnology Information

Just the Facts: A Basic Introduction to the Science Underlying NCBI Resources

**BIOINFORMATICS**

Over the past few decades, major advances in the field of molecular biology, coupled with advances in genomic technologies, have led to an explosive growth in the biological information generated by the scientific community. This deluge of genomic information has, in turn, led to an absolute requirement for computerized databases to store, organize, and index the data and for specialized tools to view and analyze the data.

The completion of a "working draft" of the human genome—an important milestone in the Human Genome Project—was announced in June 2000 at a press conference at the White House and was published in the February 15, 2001 issue of the journal *Nature*.

**What Is a Biological Database?**

A **biological database** is a large, organized body of persistent data, usually associated with computerized software designed to update, query, and retrieve components of the data stored within the system. A simple database might be a single file containing

**Figure 1.** The Science Primer provides an introduction for researchers, educators, and the public to bioinformatics, genome mapping, molecular modeling, SNPs, ESTs, microarray technology, molecular genetics, pharmacogenomics, and phylogenetics.

Online tutorials are also available to act as virtual guides in using popular NCBI services. They are accessible from the Education home page as well as from specific service Websites.

Information and tutorials

BLAST Information, Entrez tutorial, PubMed tutorial, NCBI News, Resource publications, Map Viewer exercises, Structure tutorial, NCBI Handbook

Pub Med Tutorial

Welcome!

**Figure 2.** Tutorials are available to help users find and analyze data contained in the NCBI databases.

External educational resources dedicated to biological and genetic information are available from other NIH institutes, such as MedlinePlus, the Visible Human Project and the Human Genome Project. These web-based services can be explored from the NIH home page: [www.nih.gov](http://www.nih.gov).

MedlinePlus®  
Health Information for patients, family and friends

Visible Human Project®

Anatomical cross-section images of the human body

genome.gov  
National Human Genome Research Institute  
National Institutes of Health

Educational Resources  
Genetics education for students, teachers and the general public

About The Human Genome Project  
The international effort to map the human genome.

50 years of DNA: A Celebration of the Genome  
April 2003 events

K-12 and General Education Resources  
Genetic Education Modules for Teachers  
Teaching tools that help students understand genetics and genomics.

The Human Genome Project: Exploring Our Molecular Selves  
Produced by NHGRI, this award-winning, multimedia education kit, Exploring Our Molecular Selves, includes a film describing the Human Genome Project and an animated video illustrating the basics of molecular biology.

Search

Research, Health, Policy & Ethics, Educational Resources, Careers & Training, Grants, Newsroom, About NHGRI, Home, See Also: NHGRI Speakers, DNA Kit and Museum Activities

**Figure 3.** Educational resources available from the NIH include Medline Plus, the Visible Human Project and the Human Genome Project resource.

