

Genome Database
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The release of Version 6 of the Genome Database (GDB) in January 1996 signaled a major change for both the scientific community and GDB staff. GDB 6.0 introduced a number of significant improvements over previous versions of GDB, most notably a revised data representation for genes and genomic maps and a new curatorial model for the database. These new features, along with a remodeled database structure and new schema and user interface, provide a resource with the potential to integrate all scientific information currently available on human genomics. GDB rapidly is becoming the international biomedical research community's central source for information about genomic structure, content, diversity, and evolution.

A New Data Model

Inherent in the underlying organization of information in GDB is an improved model for genes, maps, and other classes of data. In particular, genomic segments (any named region of the genome) and maps are being expanded regularly. New segment types have been added to support the integration of mapping and sequencing data (for example, gene elements and repeats) and the construction of comparative maps (syntenic regions). New map types include comparative maps for representing conserved syntenies between species and comprehensive maps that combine data from all the various submitted maps within GDB to provide a single integrated view of the genome. Experimental observations such as order, size, distance, and chimerism are also available.

Through the World Wide Web, GDB links its stored data with many other biological resources on the Internet. GDB's External Link category is a growing collection of cross-references established between GDB entities and related information in other databases. By providing a place for these cross-references, GDB can serve as a central point of inquiry into technical data regarding human genomics.

Direct Community Data Submission and Curation

Two methods for data submission are in use. For individuals submitting small amounts of data, interactive editing of the database through the Web became available in April 1996, and the process has undergone several simplifications since that time. This continues to be an area of development for GDB because all editing must take place at the Baltimore site, and Internet connections from outside North America may be too slow for interactive editing to be practical. Until these difficulties are resolved, GDB encourages scientists with limited connectivity to Baltimore to submit their data via more traditional means (e-mail, fax, mail, phone) or to prepare electronic submissions for entry by the data group on site.

For centers submitting large quantities of data, GDB developed an electronic data submission (EDS) tool, which provides the means to specify login password validation and commands for inserting and updating data in GDB. The EDS syntax includes a mechanism for relating a center's local naming conventions to GDB objects. Data submitted to GDB may be stored privately for up to 6 months before it automatically becomes public. The database is programmed to enforce this Human Genome Project policy. Detailed specifications of GDB's EDS syntax and other submission instructions are available (EDS prototype, <http://www.gdb.org/eds>).

Since the EDS system was implemented, GDB has put forth an aggressive effort to increase the amount of data stored in the database. Consequently, the database has grown tremendously. During 1996 it grew from 1.8 to 6.7 gigabytes.

To provide accountability regarding data quality, the shift to community curation introduced the idea that individuals and laboratories own the data they submit to GDB and that other researchers cannot modify it. However, others should be able to add information and comments, so an additional feature is the community's ability to conduct electronic online public discussions by annotating the