

Joint Genome Institute Genome Center Sequencing Efforts Merge

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In a major restructuring of its Human Genome Program, on October 23, 1996, the DOE Office of Biological and Environmental Research established the Joint Genome Institute (JGI) to integrate work based at its three major human genome centers.

The JGI merger represents a shift toward large-scale sequencing via intensified collaborations for more effective use of the unique expertise and resources at Lawrence Berkeley National Laboratory (LBNL), Lawrence Livermore National Laboratory (LLNL), and Los Alamos National Laboratory. Elbert Branscomb (LLNL) serves as JGI's Scientific Director. Capital equipment has been ordered, and operational support of about \$30 million is projected for the 1998 fiscal year.

With easy access to both LBNL and LLNL, a building in Walnut Creek, California, is being modified. Here, starting in late FY 1998, production DNA sequencing will be carried out for JGI. Until that time, large-scale sequencing will continue at LANL, LBNL, and LLNL. Expectations are that within 3 to 4 years the Production Sequencing Facility will house some 200 researchers and technicians working on high-throughput DNA sequencing using state-of-the-art robotics.

Initial plans are to target gene-rich regions of around 1 to 10 megabases for sequencing. Considerations include gene density, gene families (especially clustered families), correlations to model organism results, technical capabilities, and relevance to the DOE mission (e.g., DNA repair, cancer susceptibility, and impact of genotoxins). The JGI program is subject to regular peer review.

Sequence data will be posted daily on the Web; as the information progresses to finished quality, it will be submitted to public databases.

As JGI and other investigators involved in the Human Genome Project are beginning to reveal the DNA sequence of the 3 billion base pairs in a reference human genome, the data already are becoming valuable reagents for

explorations of DNA sequence function in the body, sometimes called "functional genomics." Although large-scale sequencing is JGI's major focus, another important goal will be to enrich the sequence data with information about its biological function. One measure of JGI's progress will be its success at working with other DOE laboratories, genome centers, and non-DOE academic and industrial collaborators. In this way, JGI's evolving capabilities can both serve and benefit from the widest array of partners.

Production DNA Sequencing Begun Worldwide

The year 1996 marked a transition to the final and most challenging phase of the U.S. Human Genome Project, as pilot programs aimed at refining large-scale sequencing strategies and resources were funded by DOE and NIH (see Research Highlights, DNA Sequencing, p. 14). Internationally, large-scale human genome sequencing was kicked off in late 1995 when The Wellcome Trust announced a 7-year, \$75-million grant to the private Sanger Centre to scale up its sequencing capabilities. French investigators also have announced intentions to begin production sequencing.

Funding agencies worldwide agree that rapid and free release of data is critical. Other issues include sequence accuracy, types of annotation that will be most useful to biologists, and how to sustain the reference sequence.

The international Human Genome Organisation maintains a Web page to provide information on current and future sequencing projects and links to sites of participating groups (<http://hugo.gdb.org>). The site also links to reports and resources developed at the February 1996 and 1997 Bermuda meetings on large-scale human genome sequencing, which were sponsored by The Wellcome Trust.