

Converting scientific knowledge into commercially useful products

Transferring technology to the private sector, a primary mission of DOE, is strongly encouraged in the Human Genome Program to enhance the nation's investment in research and technological competitiveness. Human genome centers at Lawrence Berkeley National Laboratory (LBNL), Lawrence Livermore National Laboratory (LLNL), and Los Alamos National Laboratory (LANL) provide opportunities for private companies to collaborate on joint projects or use laboratory resources. These opportunities include access to information (including databases), personnel, and special facilities; informal research collaborations; Cooperative Research and Development Agreements (CRADAs); and patent and software licensing. For information on recently developed resources, contact individual genome research centers or see Research Highlights, beginning on p. 9. Many universities have their own licensing and technology transfer offices.

Some collaborations and technology-transfer highlights from FY 1994 through FY 1996 are described below.

Collaborations

Involvement of the private sector in research and development can facilitate successful transfer of technology to the marketplace, and collaborations can speed production of essential tools for genome research. A number of interactive projects are now under way, and others are in preliminary stages.

CRADAs

One technology-transfer mechanism used by DOE national laboratories is the CRADA, a legal agreement with a nongovernmental organization to collaborate on a defined research project. Under a CRADA, the two entities share scientific and technological expertise, with the governmental organization providing personnel, services, facilities,

equipment, or other resources. Funds must come from the nongovernmental partner. A benefit to participating companies is the opportunity to negotiate exclusive licenses for inventions arising from these collaborations. For periods through 1996, the CRADAs in place in the DOE Human Genome Program included the following:

- LLNL with Applied Biosystems Division of Perkin-Elmer Corporation to develop analytical instrumentation for faster DNA sequencing instrumentation;
- LANL with Amgen, Inc., to develop bioassays for cell growth factors;
- Oak Ridge National Laboratory (ORNL) with Darwin Molecular, Inc., for mouse models of human immunologic disease;
- ORNL with Proctor & Gamble, Inc., for analyses of liver regeneration in a mouse model; and
- Brookhaven National Laboratory with U.S. Biochemical Corporation to identify proteins useful for primer-walking methods and large-scale sequencing.

Work for Others

In other collaborations, the LBNL genome center is participating in a Work for Others agreement with Amgen to automate the isolation and characterization of large numbers of mouse cDNAs. The center group is focusing on adapting LBNL's automated colony-picking system to cDNA protocols and applying methods to generate large numbers of filter replicas for colony

Technology Transfer Legislation

Technology transfer involves converting scientific knowledge into commercially useful products. Through the 1980s, a series of laws was enacted to encourage the development of commercial applications of federally funded research at universities and federal laboratories. Such laws [chiefly the Bayh-Dole Act of 1980, Stevenson-Wydler Act of 1980, and Federal Technology Transfer Act of 1986 (Public Laws 96-517, 96-480, and 99-502, respectively)] were not aimed specifically at genome or even biomedical research. However, such research and the surrounding commercial biotechnology enterprises clearly have benefited from them. The biotechnology sector's success owes much to federal policies on technology transfer and intellectual property. [Source: U.S. Congress, Office of Technology Assessment, *Federal Technology Transfer and the Human Genome Project*, OTA-BP-EHR-162 (Washington, D.C.: U.S. Government Printing Office, September 1995)]

