Broad Institute

The Eli and Edythe L. Broad Institute is a collaboration of the Massachusetts Institute of Technology, Harvard University and its affiliated hospitals, and the Whitehead Institute for Biomedical Research.

Between July 1, 2006 and June 30, 2007, Broad researchers embarked on new projects and continued to expand upon previous results. They used results from the International Haplotype Map Project (HapMap) to study diseases such as macular degeneration and created a new public database known as the Connectivity Map that connects diseases and drugs. The Broad expanded its projects, launching a new scientific platform, collaborating with the Stanley Center, and adding Deborah Hung to its already impressive staff of scientists. Researchers identified genetic risk factors for many kinds of cancers and other diseases. Broad-based work was published in outstanding journals such as *Nature* and *New England Journal of Medicine* and Broad researchers once again received prestigious awards and fellowships.

Mission

The Broad Institute's scientific mission is to create tools for genomic medicine and make them broadly available to the scientific community, and to apply these tools to propel the understanding and treatment of disease.

Its organizational mission is to enable collaborative projects that cannot be accomplished solely within the traditional setting of individual laboratories, and to empower scientists through access to cutting-edge tools.

Accomplishments and Future Projects

In the fall, the National Human Genome Research Institute awarded the Broad $200 million for applying and enhancing large-scale DNA sequencing. In August, codirector of the Infectious Disease Initiative Deborah Hung joined the Broad, bringing with her knowledge of chemical biology and genetics and expertise in applying high-throughput approaches to biological problems. A month later, a new scientific platform, Biological Samples, was launched to provide expertise in managing large numbers of research specimens. A $100 million gift from the Stanley Medical Research Institute in March launched a research center housed at the Broad to increase understanding and treatment for mental illness.

In September, researchers created the Connectivity Map, a public database of genomic signatures linking drugs and human disease. Researchers also built upon results from the HapMap, using this tool to find genes associated with diseases such as age-related macular degeneration (August). HapMap data also helped Broad researchers map genetic variability in a key immune region (September) and study genetic variation in various world populations (October).

Researchers also identified new risk factors for prostate cancer (August) and for breast cancer (June). They created a genome-scale map of genetic variation in the malaria

parasite to find genes involved in drug resistance (December). Researchers also developed a high-throughput method for mapping genes in tumor cells (February) and publicly released a genome-wide analysis of genes associated with type 2 diabetes and related metabolic disorders (February). They also continued the search for the genes involved in Crohn's disease and identified additional genetic risk factors associated with diabetes (April).

A project to sequence the horse genome emerged from an ongoing National Human Genome Research Institute (NHGRI) funded effort. Researchers also decoded the first marsupial genome, shedding light on how certain jumping genes have evolved, and they sequenced a corn fungal pathogen that has a significant impact on agriculture.

Major Publications

- TCF7L2 polymorphisms and progression to diabetes in the Diabetes Prevention Program, *New England Journal of Medicine* (July)
- Transformation from committed progenitor to leukemia stem cell initiated by MLL–AF9, *Nature* (July)
- Principal components analysis corrects for stratification in genome-wide association studies, *Nature Genetics* (July)
- Admixture mapping identifies 8q24 as a prostate cancer risk locus in African American men, *Proceedings of the National Academy of Sciences* (August)
- Age-related macular degeneration, *Nature Genetics* (August)
- Identifying genetic risk factors in immune-related diseases, *Nature Genetics* (September)
- Insights from the genome of the biotrophic fungal plant pathogen *Ustilago maydis*, *Nature* (November)
- Genetic variation across the malaria parasite genome, *Nature Genetics* (December)
- High-throughput oncogene mutation profiling in human cancer, *Nature Genetics* (February)
- Systematic discovery of regulatory motifs in conserved regions of the human genome, including thousands of CTCF insulator sites, *Proceedings of the National Academy of Sciences* (April)
- Genome-wide association study identifies new susceptibility loci for Crohn disease and implicates autophagy in disease pathogenesis, *Nature Genetics* (April)
- Integrative genomic approaches identify IKBKE as a breast cancer oncogene, *Cell* (June)
- Genome-wide maps of chromatin state in pluripotent and lineage-committed cells, *Nature* (June)

Honors and Awards

- The Broad Institute, along with four New York research institutions, received a $100 million grant from the Starr Foundation to apply genomic tools to cancer research.
- Associate members Manolis Kellis and Alice Ting were selected by *Technology Magazine* as top innovators younger than 35 (October).
- *US News and World Report* named Broad Institute director Eric Lander one of America's best leaders (October).
- NHGRI awarded the Broad Institute $200 million for a wide range of biomedical projects (November).
- David Altshuler, director of the Medical Population Genetics Program, and associate member Bruce Walker received grants from the Doris Duke Charitable Foundation to support translational research in human disease (December).
- Associate member Bradley Bernstein received a Charles E. Culpeper Scholarship (January).
- A Broad summer student finished among the top 10 students in the Intel Science Talent Search (February).
- The Broad Institute received a $100 million gift from the Stanley Medical Research Institute for collaborative research on psychiatric diseases (March).
- The architectural team that designed the new Broad building at 7 Cambridge Center received high honors in *R&D Magazine's* 2007 Laboratory of the Year competition (May).
- Four physician-scientists received career awards from the Burroughs Wellcome Fund (June).

Eric S. Lander
Director
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More information about the Broad Institute can be found at http://broad.mit.edu/.