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NIH Launches Effort to Place More Knockout Mice In Public Repositories

California, Missouri Centers Receive Funding to Expand Access To Mouse Models of Human Disease

BETHESDA, Md., Mon., June 12, 2006 – As part of its ongoing effort to build a public, genome-wide library of "knockout" mouse models for the study of human disease, the National Institutes of Health (NIH) today awarded $800,000 to two public mouse repositories to acquire genetically engineered mouse lines not yet widely accessible to researchers.

In the two decades since recombinant DNA technology was first used to produce lines of mice in which specific genes have been disrupted, or "knocked out," such mice have proven to be one of the most powerful tools available to study the function of genes and to create animal models of human disease. Researchers have generated knockout mice to serve as useful models of human diseases such as cancer, heart disease, neurological disorders and even obesity.

"NIH is committed to making knockout mouse models more widely accessible to the biomedical research community," said National Institute on Deafness and Other Communication Disorders (NIDCD) Director James Battey, M.D., Ph.D., who is chairman of the Trans-NIH Mouse Initiative. "Getting these valuable models into the hands of a wide range of researchers will serve to accelerate our efforts to develop new strategies for understanding and treating human disease."

Once researchers publish papers describing their work, NIH policy requires that mouse lines created through NIH-funded research be made available to the scientific community. However, the obligation to maintain mouse lines and supply them to others can be burdensome for small laboratories and individual researchers. To facilitate sharing, the National Center for Research Resources (NCRR) supports a network of public repositories that archive and distribute mouse strains. The network includes the Mutant Mouse Regional Resource Centers (MMRRC) at the University of California, Davis; the University of Missouri/Harlan facility in Columbia; the University of North Carolina, Chapel Hill; and the Jackson Laboratory in Bar Harbor, Maine.

Depositing mice in centralized repositories ensures ready availability of lines at a reasonable cost, standardizes the animals' health status and guarantees long-term preservation of lines. However, more than 3,000 of the approximately 4,000 knockout mouse lines described in the scientific literature have not yet been placed in public repositories. To increase the availability of these mouse models, the NIH Knockout Mouse Project has initiated an effort to encourage more NIH-supported researchers to place their knockout mouse lines into public repositories.

Using funds supplied by the NIH Neuroscience Blueprint and the National Institute of Allergy and Infectious Diseases (NIAID), the NCRR today awarded a total of $800,000 for deposition of existing knockout mice to MMRRC at the University of California, Davis and the University of Missouri/Harlan facility. Additionally, all of the NCRR-supported mouse repositories will use their existing capacity to further increase the number of existing mice that can be deposited. In total, NIH anticipates that more than 300 existing mouse mutants will be deposited and made available to the research community over the next two years.

NIH currently is working with the research community to develop a prioritized list of mice that can be collected under this program. Drawing upon that list, the researchers will be asked to submit the mouse lines to the repositories, which will maintain and replenish them, and distribute the lines to the biomedical research community upon request.

"We are very pleased that the NCRR's network of mouse repositories will be working together to carry out this effort. The network has an excellent track record of acquiring, maintaining and distributing mutant mouse lines. By leveraging existing infrastructure and resources, we will be able to make these mice available to researchers in a timely, cost-effective manner," said NCRR Acting Director Barbara M. Alving, M.D.

The Knockout Mouse Project is a trans-NIH initiative that aims to produce, in the next five years, a comprehensive resource of mouse mutants in which each of the approximately 20,000 genes in the mouse genome has been knocked out. The resource will greatly enhance the already considerable value of the mouse in the study of human health and disease.

In October 2005, NIH laid the foundation for the project with contracts that provided NIH and the research community access to a set of very well-characterized knockout mouse lines created by Deltagen, Inc. of San Carlos, Calif., and Lexicon Genetics Incorporated of The Woodlands, Texas. As part of this procurement, NIH also obtained a great deal of data on the observable characteristics, or phenotype, of each of the mouse lines. In the first year of the three-year contract, NIH has expended about $11 million to acquire about 250 lines of these well-characterized knockout mice. Researchers can obtain information on what lines are available and how to order them at http://www.nih.gov/science/models/mouse/deltagenlexicon/list.html.

Later this summer, through the National Human Genome Research Institute (NHGRI), the trans-NIH initiative will award a set of cooperative agreements to support the central component of the Knockout Mouse Project. These cooperative agreements, which will total up to $50 million over 5 years, will be aimed at making maximum progress toward the completion of a comprehensive resource of knockout mice lines representing all genes in the mouse genome. Awardees will use a variety of techniques, such as gene targeting, gene trapping or transposon-mediated mutagenesis, to systematically create new knockout mouse lines for the thousands of genes not included in the effort to deposit existing knockout mouse lines or the contracts with Deltagen and Lexicon. For more details on the techniques used to make knockout mice, visit http://www.genome.gov/12514551.

“It will take an enormous amount of work to build this knockout mouse resource, but we are confident the effort will be well worth it. This resource will enable many, many more researchers to tap into the power of knockout mice for exploring gene function, which in turn will speed our efforts to improve human health,” said NHGRI Director Francis S. Collins, M.D., Ph.D. “It is exciting that so many different components of NIH have pulled together to support this important project.”

The 19 NIH institutes, centers and offices contributing to the Knockout Mouse Project are: National Center for Complementary and Alternative Medicine, NCRR, National Eye Institute, NHGRI, National Heart, Lung and Blood Institute, National Institute on Aging, National Institute of Alcohol Abuse and Alcoholism, NIAID, National Institute of Arthritis and Musculoskeletal and Skin Diseases, National Institute of Child Health and Human Development, NIDCD, National Institute of Dental and Craniofacial Research, National Institute on Drug Abuse, National Institute of Environmental Health Sciences, National Institute of General Medical Sciences, National Institute of Mental Health, National Institute of Neurological Disorders and Stroke, National Institute of Nursing Research, and the Office of AIDS Research.

For more information on the Knockout Mouse Project, visit http://www.nih.gov/science/models/mouse/knockout/index.html. High-resolution photos of knockout mice are available at: http://www.genome.gov/pressDisplay.cfm?photoID=5006.

NCRR provides laboratory scientists and clinical researchers with the environments and tools they need to understand, detect, treat and prevent a wide range of diseases. For more, visit www.ncrr.nih.gov.

NHGRI supports the development of resources and technology that will accelerate genome research and its application to human health. For more, visit www.genome.gov.

The NIH Neuroscience Blueprint provides a framework for enhancing cooperation among 15 NIH Institutes and Centers, with an emphasis on supporting and making broadly available tools and resources for the neuroscience research community. For more, visit http://neuroscienceblueprint.nih.gov/

The National Institutes of Health – "The Nation's Medical Research Agency" – includes 27 institutes and centers, and is a component of the U.S. Department of Health and Human Services. It is the primary federal agency for conducting and supporting basic, clinical and translational medical research, and it investigates the causes, treatments, and cures for both common and rare diseases. For more, visit http://www.nih.gov/.

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