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The Cancer Genome Atlas Awards Funds for Technology Development

As part of The Cancer Genome Atlas (TCGA) pilot project, the National Institutes of Health (NIH) today awarded eight two-year grants totaling $3.4 million to support the development of innovative technologies for exploring the genomic underpinnings of cancer.

The National Cancer Institute (NCI) and the National Human Genome Research Institute (NHGRI), both part of NIH, announced the TCGA pilot in December 2005 to test the feasibility of a large-scale, systematic approach to identifying the changes that occur in the genomes of cancer cells. The goal is to generate genomic information that the research community can use to develop new and improved strategies for detecting, treating and, ultimately, preventing cancer.

The types of tumors being studied in the pilot include brain cancer (glioblastoma), ovarian cancer and lung cancer (squamous cell), which together account for more than 200,000 cases of cancer in the United States each year.

“In addition to the detailed genomic data it will generate, there is great hope that TCGA will both advance technological development and drive down its cost,” said NCI Director John E. Niederhuber, M.D. “Our greatest challenge will be in applying the volumes of information TCGA will provide about tumors to the genomic data NCI is gathering from large cohorts of patients, in order to better predict, and even prevent, the earliest development of cancer.”

“Cancer poses a very complex challenge. Each of the dozens of types of cancer likely will have a different genomic profile or set of profiles. We urgently need tools equal to this task,” said NHGRI Director Francis S. Collins, M.D., Ph.D., whose institute led the NIH component of the Human Genome Project. “One of the major lessons we learned

from the Human Genome Project is that technology development is essential for success."

The institutions and principal investigators chosen to receive the two-year grants are:

- **Baylor College of Medicine, Houston; Aleksandar Milosavljevic, Ph.D.; $413,000; *Comprehensive High-Throughput Mapping of Cancer Genomes.*** This project will develop methods to utilize new highly parallel DNA sequencing platforms to investigate structural variations in the genomes of cancer cells.

- **City of Hope/Beckman Research Institute, Duarte, Calif.; Gerd Pfeifer, Ph.D.; $465,000; *DNA Methylation in Cancer Genomes.*** These researchers will work on approaches for analyzing the methylation of DNA at high resolution across the genome using 1,000 cancer cells. Methylation, which involves the addition of methyl groups to the backbone of the DNA molecule, can change the way in which genes interact with the transcriptional machinery that turns genes on or off.

- **Columbia University, New York; Benjamin Tycko, M.D., Ph.D.; $443,000; *Genomic and Epigenomic Profiling by MSNP.*** This team will focus on using high-density oligonucleotide arrays to characterize genomic aberrations and DNA methylation. Oligonucleotides are short sequences of single-stranded DNA or RNA that are often used as probes for detecting complementary DNA or RNA because they bind readily to their complements.

- **Columbia University, New York; Timothy Bestor, Ph.D.; $362,000**; ***High-Throughput Profiling of Genomic Methylation Patterns.*** These researchers will develop methods for high-throughput, high-resolution profiling of DNA methylation.

- **Johns Hopkins University, Baltimore; Andrew Feinberg, M.D., M.P.H.; $464,000; *Functional Allelotyping.*** This group will generate new approaches for investigating allele-specific gene expression patterns. Allele is a term used by researchers to refer to the variant forms of a gene.

- **Nimblegen Systems, Inc., Madison, Wisc.; Thomas Albert, Ph.D.; $415,000**. ***Large-Scale Selection of Genomic Loci.*** This team will use high-density oligonucleotide arrays in an innovative fashion to select genomic regions for DNA sequence analysis.

- **Stanford University, Stanford, Calif; Ronald Davis, Ph.D.; $429,000**. ***Development of Selectors for Cancer Mutation Analysis.*** This project will develop methods for high-throughput isolation of genomic regions for DNA sequence analysis.

- **University of California-Davis; Peggy Farnham, Ph.D.; $418,000**. ***Scaling the ChIP-chip Assay to Improve Analysis of Clinical Biospecimens.*** These researchers will work on methods that can be used to conduct high-throughput investigations of cancer-associated changes in genomic regions that are important in gene regulation, using small fragments of cancer tissue.

The technology development efforts will influence other key components of the TCGA pilot project: three Genome Sequencing Centers, seven Cancer Genome Characterization Centers, a Data Coordinating Center and a Biospecimen Core Resource.

The pilot project will establish a publicly available integrated database that individual researchers can use to study the genomic changes of specific cancers to develop new targets for a new generation of drugs and diagnostics. TCGA data will be made available through public databases supported by NCI's cancer Biomedical Informatics Grid™ (caBIG™) and the National Library of Medicine's National Center for Biotechnology Information (NCBI). TCGA data will be provided in a manner that meets the highest standards for protection and respect of the research participants.

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NCI and NHGRI are two of the 27 institutes and centers at NIH, an agency of the U.S. Department of Health and Human Services.

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.

For more details about The Cancer Genome Atlas, please go to http://cancergenome.nih.gov.

For more information about cancer and the National Cancer Institute, please visit the NCI Web site at http://www.cancer.gov, or call NCI's Cancer Information Service at 1-800-4-CANCER (1-800-422-6237).

For more information about the National Human Genome Research Institute, please visit the NHGRI Web site at http://www.genome.gov.