American Recovery and Reinvestment Act of 2009

NIH Challenge Grants in Health and Science Research (RFA-OD-09-003)

National Human Genome Research Institute (NHGRI)

NIH has received new funds for Fiscal Years 2009 and 2010 as part of the American Recovery & Reinvestment Act of 2009 (Recovery Act), Pub. L. No. 111-5. The NIH has designated at least $200 million in FYs 2009 – 2010 for a new initiative called the **NIH Challenge Grants in Health and Science Research**.

This new program will support research on topic areas that address specific scientific and health research challenges in biomedical and behavioral research that would benefit from significant 2-year jumpstart funds.

The NIH has identified a range of Challenge Areas that focus on specific knowledge gaps, scientific opportunities, new technologies, data generation, or research methods that would benefit from an influx of funds to quickly advance the area in significant ways. Each NIH Institute, Center, and Office has selected specific Challenge Topics within the broad Challenge Areas related to its mission. The research in these Challenge Areas should have a high impact in biomedical or behavioral science and/or public health.

NIH anticipates funding 200 or more grants, each of up to $1 million in total costs, pending the number and quality of applications and availability of funds. In addition, Recovery Act funds allocated to NIH specifically for comparative effectiveness research (CER) may be available to support additional grants. Projects receiving these funds will need to meet this definition of CER: "a rigorous evaluation of the impact of different options that are available for treating a given medical condition for a particular set of patients. Such a study may compare similar treatments, such as competing drugs, or it may analyze very different approaches, such as surgery and drug therapy." Such research may include the development and use of clinical registries, clinical data networks, and other forms of electronic health data that can be used to generate or obtain outcomes data as they apply to CER.

The application due date is April 27, 2009.

Broad Challenge Areas and Specific Challenge Topics

Note: Those marked with an asterisk (*) are the highest priority topics; however, applicants may apply to **any** of the topics.

For NHGRI, the Challenge Topics are:

(01)Behavior, Behavioral Change, and Prevention

(02) Bioethics

02-HG-101* Informed consent and data access policies. The creation of large databases that include genomic information on individual participants, coupled with the move to universal electronic medical records, makes it increasingly possible to identify individual research participants in databases, despite efforts to "de-identify" their data, and potentially to unearth an individual's private medical information. Research is urgently needed to address the implications of this for recruitment, informed consent, and data access policies in biomedical research. Contact: Dr. Jean McEwen, 301 402-7997, jm552n@mail.gov.nih

02-HG-102 Direct to Consumer (DTC) Personal Genomics--Ethical, Legal and Social Implications Research. Direct-to-consumer marketing of targeted genetic scans for particular disease mutations and for ancestry-informative markers has been available for several years, and a growing number of companies now offer direct-to-consumer (DTC) personalized genomic services based on more comprehensive genomic analyses. The emergence of these DTC genetic testing services raises many issues: Are such services a generally positive advance that empowers the public, or are they premature? What is the potential for consumers to be educated, helped, confused, or even misled by these services? How do those who use these services react to the information they receive? How do health care providers deal with this information? Research is needed to address these and other issues related to DTC marketing of genetic tests. HHGRI Contact: Dr. Jean McEwen, 301-402-7997, jm552n@mail.gov.nih

02-HG-103 Natural selection in the human genome--Ethical, Legal and Social Implications Research. The characterization of signatures of recent positive selection in genes that are of adaptive significance in humans can have great medical relevance, by helping to identify functionally significant variants that play a role in health and disease. However, research on recent positive selection in the human genome has methodological challenges and can have significant ethical and social implications. The results of studies that attribute differences in allele frequencies between populations to recent positive natural selection may challenge past understandings about human history and the way that we think about differences. Where the frequencies differ substantially between populations (as defined by ancestral geography), these findings may affect the way we think about differences (both real and perceived) between people from various ancestral backgrounds. Research is needed on the ethical, legal and social issues associated with the way that natural selection research is designed, conducted, and the results communicated to the public. NHGRI Contact: Dr. Jean McEwen, 301-402-7997, jm552n@mail.gov.nih

02-HG-104 Uncovering Genomic Contributions to Human Traits and Behaviors: Ethical, Legal and Social Implications Research. Many studies are underway that explore the genetic contribution to non-disease attributes (e.g., the aging process, diurnal rhythms) and to behavioral traits (e.g., cognition, personality traits). These types of studies raise ethical issues similar to other types of genetic studies, but can raise heightened or in some cases unique concerns, relating especially to such issues as: definitions of "normalcy"; the potential for genetic determinism (and its societal implications); and the potential for stigmatization of individuals or groups. Research is needed that addresses these and other implications of research in this area. Contact: Dr. Jean McEwen, 301 402-7997, jm552n@mail.gov.nih

02-HG-105 Genotype-Tissue Expression (GTEx): Ethical, Legal and Social Implications Research. The GTEx project is an NIH Roadmap Initiative (http://nihroadmap.nih.gov/GTEx/) to create a public resource that will help reveal the role of genetic variation in human gene expression and regulation. This project is designed to collect and analyze multiple human tissues from diverse populations in a variety of settings, including organ transplant settings, medical examiner offices, low-post mortem

interval autopsy programs and surgical settings. The phenotypic and genomic information derived from these samples will be placed in a database and made widely available for research use. Research is needed that addresses the ethical, legal and social issues related to the collection and use of this information. Contact: Dr. Joy Boyer, 301-402-7997, jb40m@nih.gov

02-RR-101* Recontact Issues in Genotype and Genome-Wide Association Studies. Genotype and genome-wide association studies create challenging re-contact issues if subjects are later to be asked to return for clinical research including phenotyping. Applicants would propose 2-year awards for pilot programs that would be implemented at 3 or more affiliated sites to develop and apply IRB guidelines that addressed ethical barriers (e.g., re-contacting) in genotype – phenotype studies. This idea is submitted through NCRR on account of the ethics work underway at the Clinical and Translational Science Awards (CTSAs) and, if accepted, would be developed with NHGRI's ELSI Division. NCRR Contact: Andrea Sawczuk, 301-435-0792, sawczuka@mail.nih.gov; NHGRI Contact: Dr. Jean McEwen, 301-402-4997, mcewenj@mail.nih.gov

02-OD(OSP)-101* Unique Ethical Issues Posed by Emerging Technologies. Advances in biotechnology and biomedical science raise novel ethical, legal, and social issues. Research in this area is needed to understand the unique ethical concerns related to emerging technologies (e.g. biotechnology, tissue engineering, nanomedicine, and synthetic biology). These include issues such as dual use research, privacy, safety, intellectual property, commercialization and conflict of interest, among others. Research is also needed to assess how these novel issues are addressed under current oversight and regulatory structures and identify where there may be gaps and/or need for revised or new oversight approaches. OD(OSP) Contact: Abigail Rives, 301-594-1976, rivesa@od.nih.gov; NHGRI Contact: Dr. Joy Boyer, 301-402-7997, jb40m@nih.gov.

02-OD(OSP)-102* Ethical Issues in Health Disparities and Access to Participation in Research. Research is needed to assess the under-representation in biomedical and clinical research of U.S. minority populations, underserved populations, and populations who may be vulnerable to coercion or undue influence, to identify barriers to participation in research and to develop approaches for overcoming them. Additionally, studies are needed to assess the impact and ethical considerations of conducting biomedical and clinical research internationally in resource-limited countries. OD(OSP) Contact: Abigail Rives, 301-594-1976, rivesa@od.nih.gov; NHGRI Contact: Dr. Jean McEwen, 301-402-4997, mcewenj@mail.nih.gov

02-OD(OSP)-104* Ethical Issues in the Translation of Genetic Knowledge to Clinical Practice. Genetics and genomics have great promise for the development of personalized medicine, yet the ethical, legal and social implications of both the research and application of genetic and genomic knowledge and technology are far reaching. Studies are needed to better understand the factors that influence the translation of genetic information to improved human health and the associated ethical issues. Examples of studies include those to address ethical issues related to broad sharing and use of new genetic information and technologies for research to improve human health, human subjects protection in genetic and genomic research, the identifiability of genetic/genomic information and how our understanding of identifiability is evolving, return of research results and incidental findings to subjects, alternative models of informed consent for broad data sharing for research, and the impact of intellectual property (IP) issues on development of new technologies. OD(OSP) Contact: Abigail Rives, 301-594-1976, rivesa@od.nih.gov;NHGRI Contact: Dr. Elizabeth Thomson, 301-402-4997, et22s@nih.gov

02-OD(OSP)-105* Ethical Issues Raised by the Blurring between Treatment and Research. The distinction between clinical practice and research is growing less clear, a trend that may be more pronounced with respect to genetic information and medical records research. Studies are needed to better understand the ethical issues associated with this trend. Examples of studies include those to identify how this blurring in roles affects traditional human subjects protections, including, for example, essential practices such as informed consent, conceptions of the doctor/patient and investigator/subject relationship, and privacy protections. OD(OSP) Contact: Abigail Rives, 301-594-1976, rivesa@od.nih.gov; NHGRI Contact: Dr. Elizabeth Thomson, 301-402-4997, et22s@nih.gov

(03) Biomarker Discovery and Validation

(04) Clinical Research

(05) Comparative Effectiveness Research (CER)

(06) Enabling Technologies

06-HG-101* New computational and statistical methods for the analysis of large data sets from next-generation sequencing technologies. The introduction of new methods for DNA sequencing has opened new avenues, including large-scale sequencing studies, metagenomics, transcriptomics, genetic network analysis, and determination of the relationship of sequence variation and phenotypes to disease, to address heretofore unapproachable problems in biomedical research. However, since the large amounts (terabases) of data generated overwhelm existing computational resources and analytic methods, urgent action is needed to enable the translation of this rich new source of genomic information into medical benefit. Contact: Dr. Lisa Brooks, 301 496-7531, brooksl@mail.nih.gov

06-HG-102* Technologies for obtaining genomic, proteomic, and metabolomic data from individual viable cells in complex tissues. Most existing technologies can only measure the properties of a population of cells and not the properties of individual cells. Technologies that are able to use one or a small number of cells are needed to generate data to understand the molecular phenotype, or state, of a particular cell type and the role it plays in tissue and organ function in health and disease. Contact: Dr. Brad Ozenberger, 301-496-7531, bozenberger@mail.nih.gov

06-HG-103* Methods to sequence highly variable, repeat-rich regions of complex genomes. Variants in complex genomic regions, e.g. the MHC region, have implications for infectious and autoimmune diseases, yet these and many other highly repetitive and highly variable loci are often poorly represented in sequence assemblies using data from newer “short read” sequencing platforms, and are too expensive to sequence with older, Sanger-based platforms. Technology development is needed to sequence and assemble these regions efficiently and accurately or they will continue to be unexamined in large medical genomics studies. Contact: Dr. Adam Felsenfeld, 301 496-7531, felsenfa@mail.nih.gov

06-HG-104 New technology and resources for personalized medicine. To make personalized medicine a reality requires new technologies and resources, such as rapid point-of-care genotyping methods and more effective ways to use genetic testing results in conjunction with electronic medical records. Research on the effects that the utilization of such resources has on health costs and outcomes is also urgently needed to achieve

the full integration of personalized medicine into current health care systems. NHGRI contact: Dr. Ebony Bookman, 919-541-0367, bookmane@mail.nih.gov

(07) Enhancing Clinical Trials

(08) Genomics

08-HG-101* Technology and resources for high-throughput functional analysis of functional elements in genomic sequences. Computational and experimental research programs are currently identifying thousands of putative functional elements (e.g., genes and regulatory sequences) based on their sequence properties; however, new, robust, high-throughput methods are needed to carry out functional assays to determine whether and how these elements operate to determine cell states, in development, and in health and disease. Such new methods should include both cellular and whole organism methods to allow systematic analysis of the effects of both genetic (normal variation and mutation) and environmental perturbations, and should include methods for both molecular (transcriptomic, proteomic) analysis and high-throughput phenotyping. Contact: Dr. Elise Feingold, 301-496-7531, elise_feingold@nih.gov

(09) Health Disparities

10-HG-101 New information technology and resources for disease prevention and personalized medicine. Family history information forms a cornerstone for the delivery of preventive health care and the future of personalized medicine. The open-source electronic family history collection tool My Family Health Portrait (MFHP) created by the U.S. Office of the Surgeon General offers interoperability with both personal health record and electronic health record systems. MFHP provides a starting point for the development, validation, and study of compatible, open-source, electronic risk - assessment tools for preventable common chronic conditions in the context of existing health information technology systems. Much needed research on developed tools could include: qualitative and quantitative investigations of patient, provider and health system uptake, satisfaction, and utilization of such tools; qualitative and quantitative investigations of the effects such tools have on patient and provider behavior or health outcomes; or the effect such tools have on the appropriate utilization of downstream health care services. Such studies will provide a paradigm for future studies of risk assessment tools that make use of personal genomic information. Contact: Dr. Ebony Bookman, 919-541-0367, bookmane@mail.nih.gov

(10) Information Technology for Processing Health Care Data

(11) Regenerative Medicine

(12) Science

(13) Smart Biomaterials - Theranostics Technology, Engineering and Mathematics Education (STEM)

(14) Stem Cells

(15) Translational Science

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