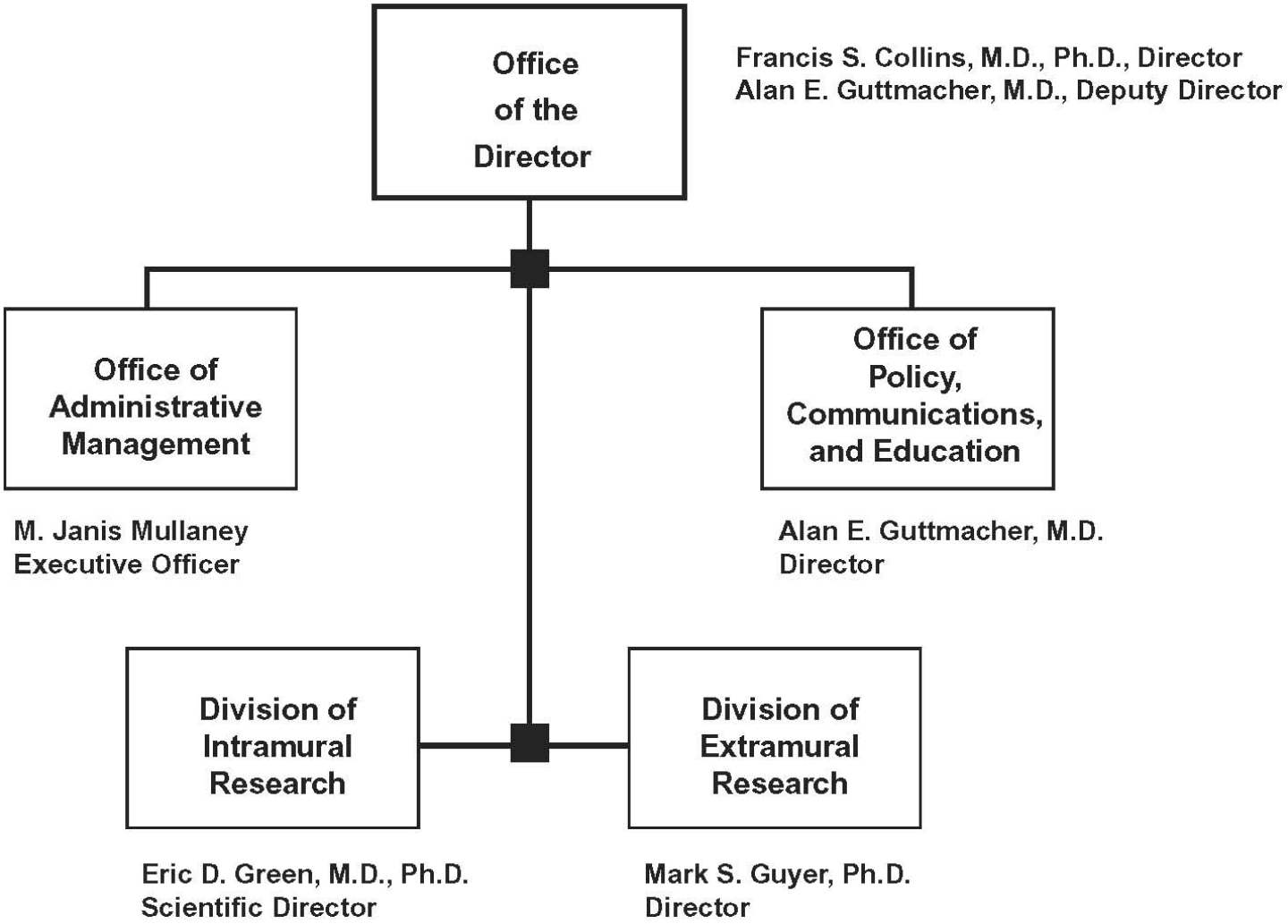
DEPARTMENT OF HEALTH AND HUMAN SERVICES

NATIONAL INSTITUTES OF HEALTH

National Human Genome Research Institute

NATIONAL HUMAN GENOME RESEARCH INSTITUTE

Organizational Structure



NATIONAL INSTITUTES OF HEALTH

National Human Genome Research Institute

For carrying out section 301 and title IV of the Public Health Services Act with respect to human genome research, ~~$495,434,000~~ ***$487,878,000*** (Department of Health and Human Services Appropriation Act, 2008)

National Institutes of Health
National Human Genome Research Institute

Amounts Available for Obligation 1/

Source of Funding	FY 2007 Actual	FY 2008 Enacted	FY 2009 Estimate
Appropriation	$486,049,000	$495,434,000	$487,878,000
Pay cost add-on	442,000	0	0
Rescission	0	-8,655,000	0
Subtotal, adjusted appropriation	486,491,000	486,779,000	487,878,000
Real transfer under Director's one-percent transfer authority (GEI)	21,765,000	0	0
Comparative transfer to NIBIB	-38,000	0	0
Comparative transfer to OD	-17,000	0	0
Comparative transfer to NCRR	-7,000	0	0
Comparative transfers to the Office of the Assistant Secretary for Admin. and Mgmt. and to the Office of the Assistant Secretary for Public Affairs	-2,000	0	0
Comparative transfer under Director's one-percent transfer authority (GEI)	-21,765,000	0	0
Subtotal, adjusted budget authority	486,427,000	486,779,000	487,878,000
Unobligated balance, start of year	0	0	0
Unobligated balance, end of year	-16,000	0	0
Subtotal, adjusted budget authority	486,411,000	486,779,000	487,878,000
Unobligated balance lapsing	0	0	0
Total obligations	486,411,000	486,779,000	487,878,000

1/ Excludes the following amounts for reimbursable activities carried out by this account:
FY 2007 - $25,231,000 FY 2008 - $27,116,000 FY 2009 - $27,617,000
Excludes $111,000 in FY 2008 and $304,000 in FY 2009 for royalties.

NATIONAL INSTITUTES OF HEALTH

National Human Genome Research Institute

(Dollars in Thousands)

Budget Mechanism - Total

MECHANISM	FY 2007 Actual		FY 2008 Enacted		FY 2009 Estimate		Change	
Research Grants:	No.	Amount	No.	Amount	No.	Amount	No.	Amount
Research Projects:								
Noncompeting	137	$75,934	151	$96,475	172	$96,214	21	-$261
Administrative supplements	(14)	3,170	(8)	1,692	(14)	3,170	6	1,478
Competing:								
Renewal	16	7,836	15	7,475	14	7,153	-1	-322
New	74	37,442	70	35,716	68	34,179	-2	-1,537
Subtotal, competing	90	45,278	85	43,191	82	41,332	-3	-1,859
Subtotal, RPGs	227	124,382	236	141,358	254	140,716	18	-642
SBIR/STTR	26	10,448	26	10,107	26	10,071	0	-36
Subtotal, RPGs	253	134,830	262	151,465	280	150,787	18	-678
Research Centers:								
Specialized/comprehensive	26	174,807	26	159,812	26	159,283	0	-529
Biotechnology	20	33,665	18	30,425	18	30,323	0	-102
Comparative medicine	0	400	0	400	0	400	0	0
Subtotal, Centers	46	208,872	44	190,637	44	190,006	0	-631
Other Research:								
Research careers	16	3,210	19	3,245	19	3,245	0	0
Other	20	1,373	20	1,388	20	1,388	0	0
Subtotal, Other Research	36	4,583	39	4,633	39	4,633	0	0
Total Research Grants	335	348,285	345	346,735	363	345,426	18	-1,309
Research Training:	FTTPs		FTTPs		FTTPs			
Individual awards	9	425	9	425	9	427	0	2
Institutional awards	138	6,407	138	6,407	138	6,441	0	34
Total, Training	147	6,832	147	6,832	147	6,868	0	36
Research & development contracts	11	15,418	11	15,093	11	15,093	0	0
(SBIR/STTR)	(0)	(24)	(0)	(24)	(0)	(24)	0	(0)
	FTEs		FTEs		FTEs		FTEs	
Intramural research	217	97,697	219	99,651	220	101,746	1	2,095
Research management and support	69	18,195	80	18,468	81	18,745	1	277
Total, NHGRI	286	486,427	299	486,779	301	487,878	2	1,099

Includes FTEs which are reimbursed from the NIH Roadmap for Medical Research

NATIONAL INSTITUTES OF HEALTH
National Human Genome Research Institute
BA by Activity
(Dollars in thousands)

	FY 2005 Actual		FY 2006 Actual		FY 2007 Actual		FY 2007 Comparable		FY 2008 Enacted		FY 2009 Estimate		Change	
Extramural Research	FTEs	Amount	FTEs	Amount	FTEs	Amount	FTEs	Amount	FTEs	Amount	FTEs	Amount	FTEs	Amount
Detail:														
Basic genomics														
Large-scale Sequencing		$150,366		$123,975		$105,029		$105,029		$72,273		$43,799		-$28,474
Medical Sequencing		0		10,026		11,006		11,006		27,400		43,800		16,400
The Cancer Genome Atlas		0		0		5,846		5,846		19,145		25,000		5,855
Genomic Function		33,832		39,322		59,201		59,201		58,599		58,394		-205
Genomic Variation		12,258		11,996		11,538		11,538		11,421		11,381		-40
Computational Genomics		44,581		47,360		45,000		45,000		44,542		44,386		-156
Technology Development		39,614		47,202		47,658		47,658		47,173		45,517		-1,656
Other basic genomics		70,298		62,723		58,314		58,314		56,351		54,134		-2,217
Translational genomics		4,389		7,798		29,599		8,315		13,323		22,607		9,284
ELSI		17,043		19,634		18,628		18,628		18,433		18,369		-64
Subtotal, Extramural		372,381		370,036		391,819		370,535		368,660		367,387		-1,273
Intramural research	212	98,505	226	97,887	217	97,775	217	97,697	219	99,651	220	101,746	1	2,095
Res. management & support	63	17,722	66	17,793	69	18,662	69	18,195	80	18,468	81	18,745	1	277
TOTAL	275	488,608	292	485,716	286	508,256	286	486,427	299	486,779	301	487,878	2	1,099

Includes FTEs which are reimbursed from the NIH Roadmap for Medical Research

Major Changes in the Fiscal Year 2009 Budget Request

Major changes by budget mechanism and/or budget activity detail are briefly described below. Note that there may be overlap between budget mechanism and activity detail and these highlights will not sum to the total change for the FY 2009 budget request for NHGRI, which is $1.099 million more than the FY 2008 Enacted, for a total of $487.878 million.

Research Project Grants (-$708,000, total $150.8 million): The NIH Budget policy for RPGs in FY 2009 is to provide no inflationary increases in noncompeting awards and no increase in average cost for competing RPGs. NHGRI will support a total of 280 Research Project Grant (RPG) awards in FY 2009. Noncompeting awards will increase by 21 awards and decrease by $261,000. Competing RPGs will decrease by 3 awards and $1.859 million. Intramural Research and Research Management and Support receive modest increases to help offset the cost of pay and other increases. NHGRI will continue to support new investigators and to maintain an adequate number of competing RPGs.

Research Centers (-$631,000; total $190.006 million): NHGRI will continue to support 44 research centers at a slightly decreased level, shifting some funds to research project grants.

Medical Sequencing (+$16.4 million; total $43.8 million): Large-scale sequencing technology has improved, and this additional funding will support new opportunities to apply genomic tools to the study of human disease. The 1000 Genomes Project will involve sequencing the genomes of at least a thousand people from around the world to create the most detailed and medically useful picture to date of human genetic variation. NHGRI will also be working with other Institutes and Center to identify opportunities to use existing patient/control cohorts to find DNA sequences associated with common, complex diseases such as cardiovascular disease and autism.

Large-scale Sequencing (-$28.474 million; total $43.799 million): Emphasis is continuing to shift from Large-scale Sequencing to Medical Sequencing and The Cancer Genome Atlas in FY 2009. The significant decrease is due to a shift in the usage of sequencing capacity from large-scale sequencing to medical sequencing and The Cancer Genome Atlas; overall funding for the sequencing program is only slightly reduced because of improvements in process efficiency. The Large-scale Sequencing program will sequence the genomes of fewer non-human organisms than it has in the past few years in order to accommodate this shift in NHGRI priorities.

The Cancer Genome Atlas (+$5.855 million, total $25 million): The Cancer Genome Atlas program is increasing for programmatic reasons, Large-scale sequencing technology has improved, and this additional funding will support new opportunities to apply genomic tools to the study of human disease including the study of cancer. FY 2009 will be the third year of The Cancer Genome Atlas pilot program, in which the analysis of the three initial tumor types (brain, lung, and ovarian cancer) will be completed.

Translational Genomics (+$9.284 million; total $22.607 million): NHGRI is expanding activity in the area of translational genomics. Large-scale sequencing technology has improved, and this additional funding will support new opportunities to apply genomic tools to the study of human disease. Efforts in FY 2009 will focus on genome-wide association studies (GWAS) for several additional diseases (to be chosen in a peer-reviewed competition) and on the development of new computational and experimental methods to follow up on the GWAS results to determine the specific genetic variations responsible for the diseases.

NATIONAL INSTITUTES OF HEALTH
National Human Genome Research Institute
Summary of Changes

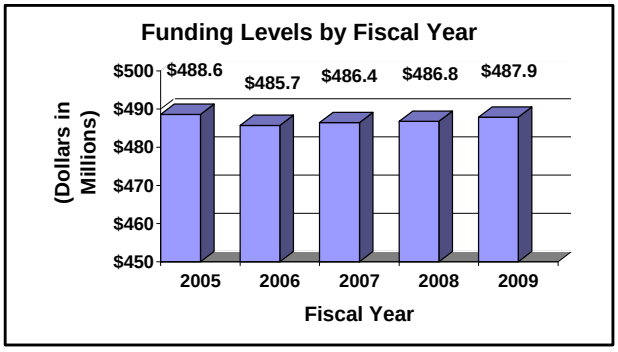
FY 2008 enacted				486,779,000
FY 2009 estimated budget authority				487,878,000
Net change				1,099,000
	2008 Enacted Base		Change from Base	
CHANGES	FTEs	Budget Authority	FTEs	Budget Authority
A. Built-in:				
1. Intramural research:				
a. Annualization of January 2008 pay increase		$30,237,000		339,000
b. January 2009 pay increase		30,237,000		657,000
c. One less day of pay		30,237,000		-2,000
d. Payment for centrally furnished services		17,107,000		256,000
e. Increased cost of laboratory supplies, materials, and other expenses		52,307,000		1,020,000
Subtotal				2,270,000
2. Research management and support:				
a. Annualization of January 2008 pay increase		$9,025,000		101,000
b. January FY 2009 pay increase		9,025,000		195,000
c. One less day of pay		9,025,000		-1,000
d. Payment for centrally furnished services		1,060,000		16,000
e. Increased cost of laboratory supplies, materials, and other expenses		8,383,000		144,000
Subtotal				455,000
Subtotal, Built-in				2,725,000

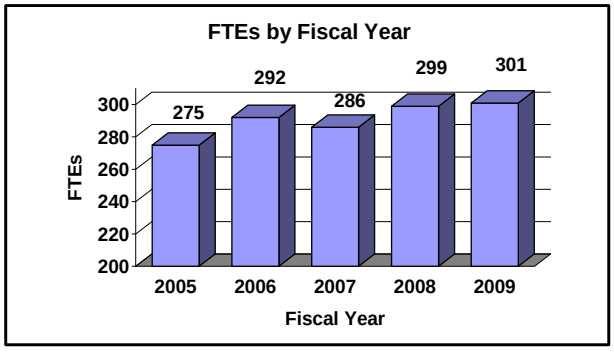
NATIONAL INSTITUTES OF HEALTH
National Human Genome Research Institute
Summary of Changes--continued

CHANGES	2008 Enacted Base		Change from Base	
	No.	Amount	No.	Amount
B. Program:				
1. Research project grants:				
a. Noncompeting	151	$98,167,000	21	1,217,000
b. Competing	85	43,191,000	(3)	-1,859,000
c. SBIR/STTR	26	10,107,000	0	-36,000
Total	262	151,465,000	18	-678,000
2. Research centers	44	190,637,000	0	-631,000
3. Other research	39	4,633,000	0	0
4. Research training	147	6,832,000	0	36,000
5. Research and development contracts	11	15,093,000	0	0
Subtotal, extramural				-1,273,000
	FTEs		FTEs	
6. Intramural research	219	99,651,000	1	-175,000
7. Research management and support	80	18,468,000	1	-178,000
Subtotal, program		486,779,000		-1,626,000
Total changes	299		2	1,099,000

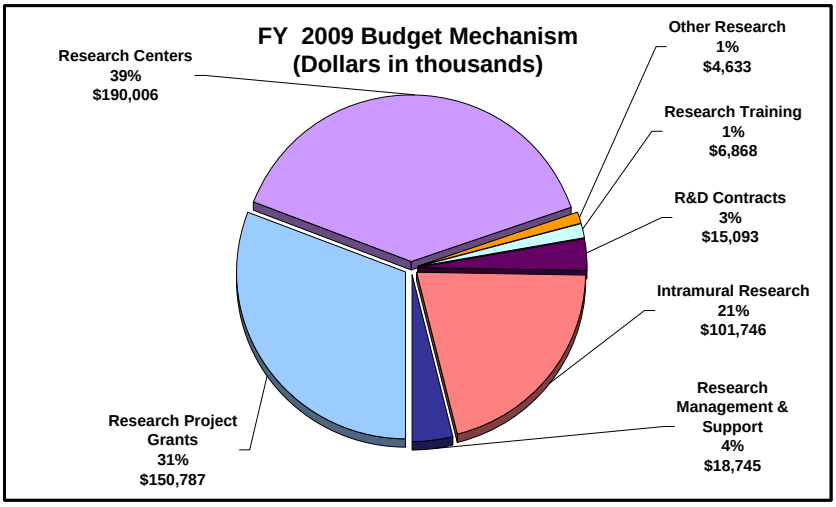
Fiscal Year 2009 Budget Graphs

History of Budget Authority and FTEs:

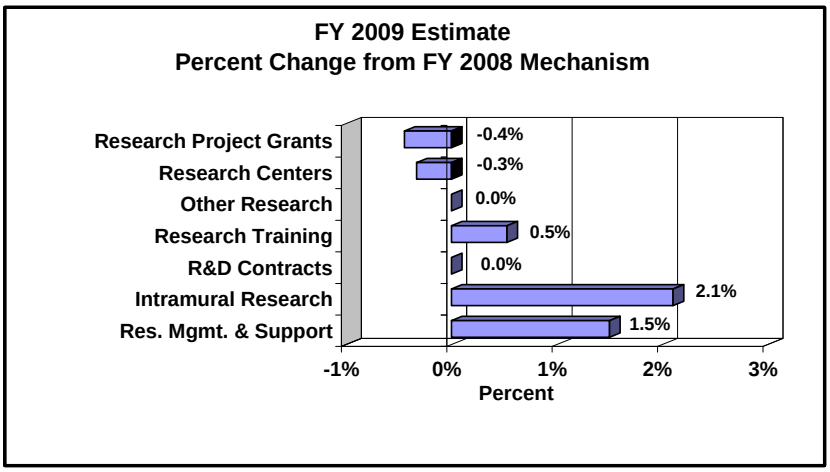




Distribution by Mechanism:



Change by Selected Mechanism:



Justification

National Human Genome Research Institute

Authorizing Legislation: Section 301 and title IV of the Public Health Service Act, as amended.

Budget Authority:

FY 2007 Actual		FY 2008 Enacted		FY 2009 Estimate		Increase or Decrease	
FTE	BA	FTE	BA	FTE	BA	FTE	BA
286	$486,427,000	299	$486,779,000	301	$487,878,000	+2	+$1,099,000

This document provides justification for the Fiscal Year (FY) 2009 activities of the National Human Genome Research Institute (NHGRI), including NIH/AIDS activities. Details of the FY 2009 HIV/AIDS activities are in the "Office of AIDS Research (OAR)" Section of the Overview. Details on the Common Fund are located in the Overview, Volume One. Program funds are allocated as follows: Competitive Grants/Cooperative Agreements; Contracts; Direct Federal/Intramural and Other.

DIRECTOR'S OVERVIEW

After leading the Human Genome Project to the successful completion of its extraordinary goal of sequencing the entire human genome in 2003, NHGRI expanded its mission to encompass a broad range of studies aimed at understanding the structure and function of the human genome and its role in health and disease. To that end NHGRI supports the development of resources and technology that will accelerate genome research and its application to human health, thus enabling truly preemptive, predictive, personalized, and participatory health care. Additional critical components of NHGRI's mission are fostering research in the ethical, legal and social implications (ELSI) of genomic discoveries; developing strategies for addressing and eliminating health disparities; disseminating genomic information to the public and health professionals; and providing support to train and educate the next generation of genomic investigators.

Windfall of Discoveries of the Genetic Basis of Disease

Two historic international efforts, with NHGRI at the helm, have moved us closer to a future that uses genomic information to predict, diagnose, treat, and preempt disease. The Human Genome Project spelled out all the letters of our DNA sequence and the HapMap Project provided a map of genomic variation—of the spelling differences in the human instruction book that can predispose us to, or protect us from, diabetes, heart disease, cancer, AIDS or other common diseases.

With unprecedented speed, researchers have used these resources to identify a stunning number – over 70 in 2007 alone – of genetic factors associated with some of the most common causes of morbidity and mortality in the United States today, including diabetes, cardiovascular disease, prostate cancer, and multiple sclerosis.

This novel approach, using "genome-wide association studies" (GWAS) that survey the genome comprehensively and identify genes involved in common diseases, reveals the biology of human disease and can lead to improved diagnostic, therapeutic, and preemptive approaches. For instance, using this approach, a genetic association was found in 2005 in age-related macular degeneration (the leading cause of severe vision loss in older Americans), giving researchers an entirely novel perspective on the disease and providing new inroads to both personalized treatment and preemptive strategies.

The pace of discovery is likely to accelerate further because the second-generation map of human genetic variation (Phase II HapMap), completed in 2007, has three times the resolution of the original map and allows researchers to identify variations associated with disease more quickly and accurately. NHGRI played a lead role in establishing the Genetic Association Information Network (GAIN), which combines resources and efforts through a public-private partnership to perform GWAS studies on numerous disorders and diseases. The Genes, Environment and Health Initiative (GEI) is a research effort to determine the relationships between environmental exposures and genetic predisposition to disease, starting with several common diseases such as coronary heart disease, diabetes, and lung cancer. All GAIN and GEI datasets are publicly available, to promote rapid dissemination of research findings.

Beyond Genes – How Does the Genome Work?

The completion of the first phase of the ENCyclopedia Of DNA Elements (ENCODE) has significantly changed the landscape of functional genomics and revealed the genome as even more complex than scientists previously thought. The ENCODE pilot, an international research consortium led by NHGRI, identified and characterized the functional elements encoded in one per cent of the three-billion DNA bases of the genome. Following the pilot's successful model of multidisciplinary team-work, the scale-up to the full genome ENCODE began in FY 2008. This encyclopedic approach will be an invaluable public resource for gaining insight into the role of different DNA elements associated with disease, ultimately fueling our ability to translate this knowledge into prediction, prevention, and treatment strategies.

Technology Development

Fueling the swift pace of genomic discoveries is NHGRI's commitment to the development of innovative sequencing technologies to reduce the cost and increase the speed of DNA sequencing. Over the past decade, the cost of sequencing has dropped more than 50-fold, in part because the Human Genome Project delivered - in addition to the complete DNA sequence - a wealth of tools, technologies, and process improvements to the sequencing enterprise. NHGRI's near-term goal for the past five years is to lower the cost of sequencing a mammalian-sized genome to $100,000, with the ultimate goal of whole-genome sequencing for $1,000 or less by the year 2014.

NHGRI funds projects to refine current approaches to achieve the near-term goal and others to develop completely novel approaches to achieve the ultimate goal, which would greatly expand the use of personal genomic information in biomedical research. Moreover, the $1000 Genome could enable health care professionals to personalize prediction, diagnosis, treatment, and preemption of disease to each person's unique genetic profile.

Human Microbiome Project

Interactions between the human host and microbial communities at multiple body sites are important for health, yet relatively little is known about them. The Human Microbiome Project (HMP), an NIH Roadmap initiative begun in September 2007 to tackle this complex relationship, will develop novel technological and analytic tools to: characterize the genomes of the indigenous microbes of the human nose, mouth, gut, vagina, and skin, referred to as the human microbiome; determine whether individuals share a core human microbiome; and determine the relationship between the human microbiome and changes in human health.

Moving toward Genomic Medicine: An Innovative and Proactive Approach

The innovative technology development and basic research described above will serve as the foundation for a personalized health care system that tailors treatments to each individual based upon knowledge of their own genetic make up. This approach will allow new treatment strategies that rely on choosing the right medicine for the right person at the right time. In addition, personalized disease risk prediction profiles will allow individuals to make lifestyle and medical choices that delay, or even completely prevent, the onset of many common diseases. NHGRI understands that fully realizing the potential of such genomic medicine requires a multipronged approach that includes health applications research, education of health professionals and the public, and community involvement in answering the complex ethical, legal, and social questions that this powerful new level of knowledge of the individual raises.

FY 2009 JUSTIFICATION BY ACTIVITY DETAIL

Overall Budget Policy: Investigator-initiated research projects and new investigator research and career development are the Institute's highest priorities. The NHGRI carefully evaluates investigator-initiated requests to submit grant applications for all large programs. A scientific review is conducted, and the results are presented to the NHGRI Advisory Council to determine the level of recommended support, if any. The level of support provided for Institute-initiated projects (e.g., RFAs) is also evaluated. The Institute maintains a balance between solicitations issued to the extramural community in areas that need stimulation and funding made available to support investigator-initiated projects.

Program Descriptions and Accomplishments

EXTRAMURAL RESEARCH

Basic Genomics

Large-scale Sequencing

One of the objectives of contemporary biomedical research is to define and understand how the human genome functions. Comparison of the genome sequence of humans with that of other organisms identifies regions of similarity and difference, providing insight into the evolution, structure, and function of human genes and pointing to new strategies to combat human disease. Therefore, genome sequencing of multiple non-human species remains an important approach to biomedical research and a priority for NHGRI.

Currently, 163 genomes are either in the pipeline or have been completed by NHGRI. The rhesus macaque monkey genome sequence was completed in FY 2007, shedding light on differences with chimpanzee and human genomes. Among other genome sequences completed in FY 2007 were the first marsupial genome, from a South American opossum, and 12 closely related fruit fly species. Upcoming sequencing targets include several non-human primates, additional mammals, fungi, and multiple strains of yeast. NHGRI funds this work by supporting three large-scale sequencing centers that are world-renowned for their cost effective and high quality work.

Budget Policy: The FY 2009 budget estimate for large-scale sequencing is $43.799 million, a decrease of $28.474 million or -39.4 percent from the FY 2008 Enacted. NHGRI will continue the restructuring of its large-scale sequencing program that was initiated in FY 2007 by redeploying additional sequencing capacity from applications designed to reveal the functional components of the human genome sequence to applications that will reveal the DNA sequences of the genomic determinants underlying disease and disease risk. The decrease is due to a shift in the usage of sequencing capacity from large-scale sequencing to medical sequencing and The Cancer Genome Atlas; overall funding for the sequencing program is only slightly reduced because of improvements in process efficiency. The redeployment is made possible by two factors. First, a considerable amount of the sequence data needed for interpretation of the

human genome sequence has been obtained in the past five years, since the completion of the first human reference sequence. Second, continued decreases in the cost of DNA sequencing through technology development enable NHGRI to generate large amounts of sequence information for lower cost.

Medical Sequencing

As more is learned about the genomic contribution to disease, genomic sequence information will become ever more important for providing medically relevant information to individuals. When it becomes affordable to sequence any individual's genome completely, such information will allow estimates of future disease risk and improve the prevention, diagnosis, and treatment of disease. NHGRI's medical sequencing program, initiated in FY 2007, aims both to drive continued technology improvement (which lowers the cost of genome sequencing) and to produce data useful to biomedical research.

Nine studies are currently underway to identify the genes responsible for several relatively rare, "single-gene" diseases and to survey the range of gene variants that contribute to certain common diseases. In FY 2008, additional medical sequencing projects were initiated: 1) Sequencing the genomic regions identified in genome-wide association studies as containing genetic components underlying common diseases, such as diabetes, breast cancer, schizophrenia, or Crohn's disease; 2) Sequencing the genomes of important human pathogens, such as those that cause malaria and sleeping sickness, and their invertebrate vectors (in collaboration with the National Institute of Allergy and Infectious Disease); and 3) The Cancer Genome Atlas project (see below). NHGRI's Medical Sequencing Working Group continues to chart a course toward clinical application of medical sequencing, as well as to provide guidance on setting policies for ethical, legal, and social issues arising from the program.

Budget Policy: The FY 2009 budget estimate for medical sequencing is $43.800 million, an increase of $16.4 million or +59.9 percent over the FY 2008 Enacted. Medical sequencing is increasing for programmatic reasons, as large-scale sequencing technology has improved and created new opportunities to apply genomic tools to the study of human disease. In FY 2009, NHGRI will continue the expansion of its medical sequencing program that was initiated in FY 2007 by redeploying additional sequencing capacity from applications designed to reveal the functional components of the human genome sequence to applications that will reveal the DNA sequences of the genomic determinants underlying disease and disease risk. The medical sequencing program will analyze additional diseases in the three areas with which the program began, single-gene diseases, sex-linked diseases, and genes known to contribute to certain common diseases. The program will also continue to sequence the genomes of important human pathogens and their vectors. The medical sequencing program will also expand by applying sequence analysis to genomic regions implicated in other common diseases by Genome-Wide Association Studies, for the purpose of identifying the individual genes in those regions that contribute to common diseases such as bipolar disorder, diabetic nephropathy, psoriasis, and schizophrenia.

The Cancer Genome Atlas

All cancers are diseases of the genome, due to DNA mutations and epigenetic changes that lead to uncontrolled cell growth. Genomic analysis is a critically important approach in cancer research and has already led to diagnostic tests and the development of new treatments that target cancer cells with specific genetic changes. NHGRI's cancer genome sequencing programs enable us to diagnose, treat, and prevent cancer more quickly and more effectively.

In FY 2007, a collaborative effort among the NHGRI large-scale sequencing centers and cancer biology experts showed that comprehensive genomic analysis could reveal previously unknown genes that play an important role in lung adenocarcinoma. The Cancer Genome Atlas (TCGA), jointly supported and led by NHGRI and the National Cancer Institute (NCI), was initiated in FY 2007 to apply this approach to cancer research on a larger scale. NHGRI, in collaboration with NCI, will continue funding three sequencing centers to work on genomic sequencing for TCGA. TCGA will further develop and test the complex science and technology framework needed to identify the mutations and other genomic changes associated with each type of cancer. In FY 2009, the focus will be on completion of the analysis of glioblastoma (brain cancer), squamous cell lung cancer, and ovarian cancer.

Budget Policy: The FY 2009 budget estimate for TCGA is $25.0 million, an increase of $5.855M or +30.6 percent over the FY2008 Enacted. In FY 2009, the focus of the sequencing component of the TCGA pilot will be on completion of the analysis of glioblastoma (brain cancer) and initiation of the analysis of squamous cell lung cancer. As a result of anticipated cost reductions and the increased availability of samples, the pilot effort will be able to analyze a larger number of genes in each tumor type and/or a larger number of tumor samples in FY 2009 compared to the number that were analyzed in the first two years of the TCGA.

Genomic Function

NHGRI supports research to identify and characterize the function of every part of our genome and to understand their biological relevance. Efforts to uncover functional elements are not limited to the human genome, since understanding the genomes of other, "model," organisms can also give insight into the structure and function of the human genome.

Launched in FY 2003 as a pilot, the ENCyclopedia Of DNA Elements (ENCODE) Project successfully demonstrated its ability to provide important information about the structure and function of 1% of the human genome. In FY 2007 NHGRI implemented a full-scale ENCODE Project to examine the entire human genome for sequence-based functional elements. modENCODE was also initiated in FY 2007 with similar goals for the analysis of the genomes of two important model organisms. NHGRI continues to support two trans-NIH initiatives to develop publicly available resources critical to accelerating research on genomic function: 1) the Mammalian Gene Collection (MGC), which expects to finish obtaining full-length clones for every human and mouse gene in FY 2008; and 2) the Knockout Mouse Project (KOMP), a collaboration with European and Canadian groups that seeks to produce a mutation in every mouse gene. In FY

2007, NIH funded the establishment and support of a repository for KOMP to facilitate material storage and distribution as part of the Project's effort to understand genomic function by providing the resources to determine the role played by each gene in this important model mammal.

Budget Policy: The FY 2009 budget estimate for Genomic Function programs is $58.394 million, a decrease of $205,000 or -0.3 percent from the FY 2008 Enacted. Activity in Genomic Function will remain constant, maintaining the proportion of the NHGRI extramural budget being devoted to this area. The major foci of NHGRI's activities in FY 2009 will be continuation of three large-scale efforts in the area of genomic function: the expansion of the ENCODE Project to the whole-genome scale for analysis of sequence-based functional elements in humans, continuation of the modENCODE Project in model organisms, and continuation of the KOMP. The Institute also will continue to fund meritorious investigator-initiated applications submitted in response to announcements that encourage new technologies and new approaches to the analysis of genomic function.

Portrait of a Program: Scaling ENCODE to the Whole Genome

FY 2008 Level: $21.972 million
FY 2009 Level: $16.939 million
Change -$5,033 million

The completion of the Human Genome Project in 2003 was a major achievement, but the sequencing of the genome marked just the first step toward the goal of using such information to diagnose, treat, and prevent disease. Identifying and characterizing all the functional elements encoded in the three billion DNA bases of the genome is the goal of the ENCyclopedia Of DNA Elements (ENCODE) project, an international research consortium led by NHGRI. In keeping with NHGRI's open access principles, all data generated by ENCODE researchers is freely available to the public immediately upon experimental verification. NHGRI reduced its budget request for ENCODE because some of the funds spent in starting the scale-up went for one-time equipment purchases. We are also expecting increases in efficiency due to strategic and technological improvements that will allow the ENCODE grantees to meet the program's objectives for a somewhat lower cost.

Initiated in 2003, the pilot phase of ENCODE was completed successfully in June 2007, including a landmark paper in *Nature* and 28 companion papers in a special issue of *Genome Research*. The ENCODE pilot project exhaustively characterized all functional elements in a carefully chosen one per cent of the entire genome, by bringing together experimental and computational biologists. Numerous new findings from the pilot ENCODE project challenge established views of the gene-dominant genome and are forcing the research community to reconsider presumptions about what was long called "junk DNA" – those DNA sequences not encoding genes.

The need to understand the function of these non-gene DNA sequences is underscored by recent discoveries about genetic factors associated with common diseases. Using the tools of the Human Genome Project and the HapMap – a catalog of variation between individuals – scientists are able to look for associations between disease and DNA variation. Such research, while implicating potential roles for genes, has also implicated many DNA variants that fall outside of genes. For instance, one of the strongest genetic associations identified for prostate cancer is located in a region far from any known genes. Determining what that DNA does and how it is involved in prostate cancer is currently a daunting task. ENCODE will be invaluable for gaining insight into the role of non-gene DNA elements like these, ultimately fueling our ability to translate this knowledge into prevention and treatment strategies.

The pilot ENCODE project involved 308 scientists from 10 countries and established the techniques and infrastructure required to identify and characterize the many different types of functional elements in the genome. Following the pilot's successful model of multidisciplinary team-work, the scale-up to the full genome began in FY 2008 with grants totaling $80 million over four years. The genome-wide ENCODE will undoubtedly provide us with a more complete picture of the biological roots of human health and disease, and will empower researchers working on virtually all human diseases.

Genomic Variation

Although the genome sequence variation between two people is less than one percent, this tiny difference underlies a variety of observable characteristics ranging from the benign, such as hair or eye color, to disease, such as diabetes, cancer, Alzheimer's, or heart disease. The NHGRI-led International HapMap Project charted the common patterns of genetic variation in the world's population by identifying and cataloging single letter spelling variations in our genome's alphabet, referred to as single nucleotide polymorphisms, or SNPs. The goal of the HapMap is to provide the resource necessary to identify disease-causing variants with the potential of using these discoveries to develop treatments.

In FY 2007, the promise of the HapMap as an unparalleled resource for human genetics was dramatically realized, with the identification of a host of new genes involved in a number of common diseases. Over 70 new loci contributing to common human diseases were identified for diseases including heart attack, diabetes, prostate and breast cancers, rheumatoid arthritis, inflammatory bowel disease, and many others. Additionally, the second generation haplotype map, Phase II HapMap, was completed and published in FY 2007. At three times the resolution of the original, Phase II will facilitate many new studies to investigate the link between genetic variation and other factors involved in health and disease, including susceptibility to infection, response to environmental factors, and drug efficacy. In FY 2008, NHGRI initiated a program to obtain a more complete catalogue of human sequence variation by using new and more cost-effective sequencing technologies to sequence the genomes of approximately 1000 individuals.

Budget Policy: The FY 2009 budget estimate for Genomic Variation programs is $11.381 million, a decrease of $40,000 or -0.4 percent from the FY 2008 Enacted. Activity in Genomic Variation will remain constant, maintaining the proportion of the NHGRI extramural budget being devoted to this area. The NHGRI will continue support of the effort, which began in FY 2006, to analyze structural variation in the human genome and to determine the contribution of structural variants to human diseases. The Institute also will continue to fund meritorious investigator-initiated applications submitted in response to announcements that encourage new technologies and new approaches to the analysis of genetic variation, the role that genetic variation plays in the determination of human disease, disease susceptibility, and environmental sensitivities.

Computational Genomics

As the speed of genotyping and DNA sequencing increase (accompanied by a continued decrease in their costs), the rate of data production will increase even more rapidly. NHGRI supports a number of efforts in computational genomics research to continue development of database technology and computational methods critical to genome-wide studies.

NHGRI will continue its support for genomic databases, an essential resource utilized worldwide to accelerate biomedical research. Ongoing and planned program announcements encourage development of new technologies and new approaches to the emerging issue of how to make the enormous amount of data generated by large-scale, genomic studies available to the broad research community and how to analyze such large datasets.

Budget Policy: The FY 2009 budget estimate for Computational Genomics programs is $44.386 million, a decrease of $156,000 or -0.3 percent from the FY 2008 Enacted. Activity in Computational Genomics will remain constant, maintaining the proportion of the NHGRI extramural budget being devoted to this area. In FY 2009, the NHGRI will continue its support for the essential resource represented by genomic databases. The Institute also will continue to fund meritorious investigator-initiated applications submitted in response to announcements that encourage new technologies and new

approaches to the emerging issue of how to make the enormous amount of data being generated by large-scale, genomic studies available to the broad research community, and how to analyze such large datasets.

Technology Development

The mission of NHGRI's technology development programs is to make DNA sequencing and other genomic analyses faster and more cost effective for use in both medical research and health care. The cost of DNA sequencing has fallen dramatically, more than 50-fold, over the past decade and continues to fall. The ability to sequence an individual genome inexpensively would not only further biomedical research, but would enable health care professionals to tailor diagnosis, treatment, and prevention strategies to each person's own genetic profile.

NHGRI-supported grants were instrumental in the development of three new sequencing instruments now on the market and one more nearing market introduction. Grants supporting the creation of novel tools and technologies show promise to reduce further the cost of sequencing a human-sized genome, from the cost of ~$10 million within the past 2 years to $100,000 within the next two. Another set of more than two dozen grants fund investigators who are developing breakthrough technologies that should make it possible to sequence a human genome for $1,000 within several years.

Budget Policy: The FY 2009 budget estimate for technology development is $45.517 million, a decrease of $1.656 or -3.5 percent from the FY2008 Enacted. The NHGRI will continue in FY 2009 its ground-breaking efforts to reduce the cost of DNA sequencing to the point where the technology can be used as a widely disseminated research tool and as a tool for individual healthcare.

Other Basic Genomics

Multi-investigator, interdisciplinary research teams are crucial to develop novel and innovative genomic research projects and to foster the wider application of comprehensive, high-throughput genomics methods to the study of human biology and disease, using and expanding the data sets and technologies developed by the Human Genome Project.

Started in FY 2001, NHGRI's Centers of Excellence in Genomic Science (CEGS) program supports the formation of such teams and also provides focal points for providing education and training about genomic research opportunities to members of under-represented population groups. In FY 2007, NHGRI announced grants to establish a new CEGS focused on viral infections and renew support of a CEGS studying vertebrate diversity.

Budget Policy: The FY 2009 budget estimate for other basic genomics programs is $54.134 million, a decrease of $2.217 million or -3.9 percent from the FY 2008 Enacted. In FY 2009, the NHGRI will continue support the CEGS program in its efforts to stimulate highly innovative research approaches that will substantially advance the state of the art in genomic approaches to the study of a biological problem, and to foster the

wider application of comprehensive, high-throughput genomics methods to the study of human biology and disease.

Translational Genomics

NHGRI is strongly committed to translating the information gleaned from studies of genomic function and variation into clinical applications. Diseases arise from a complex interplay between genes and environment; therefore, DNA variations, epigenetic factors, and external factors acting "on" the genome must all be considered in diagnosing and treating patients. Understanding this interplay will truly revolutionize our approach to health and health care, allowing not only much more accurate prediction of disease, but, ultimately, individual-based disease prevention.

In FY 2007, the initial projects of the Genes, Environment and Health Initiative (GEI), a collaboration with the National Institute for Environmental Health Sciences, were funded to identify and understand the interactions of environmental exposures with specific genetic variation. These included eight genome-wide association studies (focusing on addiction, birth weight, coronary heart disease, dental caries, lung cancer, oral clefts, prematurity and type 2 diabetes), two genotyping centers, a coordinating center, and more than 30 environmental technology projects. Another "bench to bedside" translational research project is an innovative study, in collaboration with the National Heart, Lung and Blood Institute, to evaluate the use of genetic variants to personalize the dosing of a commonly-used and potentially risky medication, Coumadin.

Budget Policy: The FY 2009 budget estimate for translational genomics is $22.607 million, an increase of $9.284 million or +69.6 percent from the FY 2008 Enacted. NHGRI is expanding activity in the area of translational genomics, as the application of advances in genomics to problems of human health have a very high programmatic priority. Areas of expansion will include the investigation, in well-characterized population samples, of genetic variants identified as potentially causally associated with complex diseases in genome-wide association and other genetic studies, in order to utilize existing prospective cohort studies and clinical trials to: 1) determine the population impact of putative risk variants, including prevalence, disease risk, and associations with other health characteristics; 2) identify modifiers of gene-trait associations, particularly those related to lifestyle factors or medication use; and 3) identify potential clues to gene function, by examining associations of putative risk variants with related phenotypic characteristics such as laboratory measures or imaging findings.

Ethical, Legal, and Social Implications

As the use of genetics and genomics in translational and clinical studies increases, the importance of addressing the ethical, legal, and social implications (ELSI) of the results of genetic and genomic research continues to grow as well. NHGRI addresses such issues through its ELSI Research Program and through public consultation and community engagement that identifies and responds to culturally specific concerns and

gives participating communities input into research, importantly including the informed consent and sample collection processes.

In FY 2006, NHGRI launched an initiative to address the challenges of ELSI research related to use of genetics and genomics in translational and clinical studies, the Centers of Excellence in ELSI Research (CEERs) program. The CEERs are charged with: 1) fostering the multi-disciplinary approaches necessary to make advances in understanding the issues that will be raised by progress in genomic science, 2) translating ELSI research findings to research, health, and public policies and practices and, 3) training the next generation of ELSI researchers. In FY 2008, NHGRI established two new centers focused on the ELSI issues surrounding large-scale genomics research and emerging genetic technologies.

Budget Policy: The FY 2009 budget estimate for the ELSI program is $18.369 million, a decrease of $64,000 or -0.3 percent from the FY 2008 Enacted. The ELSI budget is legislatively mandated at 5 percent of the total NHGRI extramural budget. In FY 2009, the NHGRI will continue to support the ELSI research program in its efforts to anticipate and address the social, legal, and ethical issues that will arise from the new information about the human genome and the genetic contribution to human disease, and new approaches to applying that information to the improvement of human health.

INTRAMURAL RESEARCH

NHGRI intramural researchers continue to focus on the genetic components of both rare and common disorders. As an example, a team of researchers led by NHGRI investigators completed in 2007 the most comprehensive look to date at genetic risk factors for type 2 diabetes, identifying at least four new genetic variants associated with increased risk of diabetes and confirmed existence of another six. These findings boosted to at least 10 the number of genetic variants confidently associated with increased susceptibility to type 2 diabetes – a disease that affects more than 200 million people worldwide. Other research performed within the institute continues to have a profound impact on our understanding of more rare genetic disorders.

The NHGRI Division of Intramural Research plans to increase its focus on translational research in FY 2009. Towards this end, the Institute recently created a new Office of Translational Research, which is intended to encourage collaborations between basic scientists and clinical investigators, thereby facilitating the translation of promising laboratory discoveries into new medical treatments and approaches for numerous genetic and genomic disorders.

Two recently launched clinical genomics initiatives are now in full stride. The first, called ClinSeq, is a pilot study aimed at developing the technologic and procedural infrastructure to facilitate large-scale medical sequencing (LSMS) in a clinical research setting. The second, called the Multiplex Initiative, is a research study intended to provide and evaluate patients' reactions to genetic susceptibility testing for several common health conditions, such as cardiovascular disease and osteoporosis. These initiatives are providing a foundation for studies in genetic-based personalized medicine

The Institute will continue to strengthen its efforts in a number of key areas of human genetics and genomics, including cancer genomics and genomic medicine; key faculty recruitments are currently under way. The Institute will continue its commitment towards providing its investigators with state-of-the-art research resources and world-class expertise through its seven core facilities, which specialize in areas such as the development of mouse and zebrafish models of human disease, flow cytometry, chip-based gene expression analysis, and bioinformatics.

NHGRI will continue its strong commitment to multidisciplinary training. Specific emphasis will be placed on promoting training and research opportunities for physicians committed to pursuing translational research through its Physician-Scientist Development Program, a program aimed at creating a cadre of individuals that can apply genomic techniques towards improving human health. NHGRI will also significantly increase its efforts to attract and train scientists from traditionally underrepresented minority communities with an interest in the underlying genetic basis of human disease. For the latter, the NHGRI Intramural Program recently recruited a world-class African-American researcher whose studies the genetics and genomics of health disparities. He will become the founding Director of the NIH Intramural Center for the Genomics and Health Disparities, a new trans-NIH research entity that will open in the third quarter of 2008.

Budget Policy: The FY 2009 budget estimate for Intramural research is $101.746 million, an increase of $2,095,000 or +2.1 percent from the FY 2008 Enacted. This increase reflects: (1) funding provided to the newly created NIH Intramural Center for Genomics and Health Disparities; (2) the addition of new Tenure-Track Investigators that will arrive at the end of FY 2008 following rigorous searches and recruitments; and (3) addition of personnel in the Office of Translational Research.

Portrait of a Program: ClinSeq

FY 2008 Level: $3.45 million
FY 2009 Level: $4.49 million
Change +$1.04 million

The ClinSeq study, conducted by a team of NIH researchers, will test the use of human genome sequencing in a clinical research setting. High-throughput DNA sequencing will be used to determine whether tiny changes in selected genes may indicate predisposition to, or onset of, common diseases. Initially, researchers will sequence approximately 200-300 genes suspected to play a role in coronary heart disease and will follow participants for as many as 10 years. The study has several goals, including detecting genetic changes that increase the risk for cardiovascular disease, developing the process by which genomic sequencing can be used as part of clinical research, and assessing whether participants want to learn genetic information and how they respond to this information. Later, researchers hope to study other conditions and genes, with the eventual goal of sequencing most or all of participants' genes.

ClinSeq plans to recruit 1,000 participants who fall within a spectrum of coronary artery disease risk from normal to disease symptoms. To enable researchers to classify participants according to risk, each patient will have a thorough pre-test evaluation including meeting with a genetic counselor to assess family health history, an EKG, an echocardiogram, and a CT to assess calcification within the coronary arteries. Additionally, risk evaluations for common multigenic disorders will be done and further tests may be run in the future. Approximately 200 individuals are currently enrolled, and ClinSeq has already detected a participant with a previously unrecognized gene mutation that causes high cholesterol.

RESEARCH MANAGEMENT AND SUPPORT

The NHGRI's Office of the Director, part of the RMS program, oversees the operation of the institute and includes a number of component parts. Two major ongoing initiatives for which the Office of the Director provides key leadership and financial support are National DNA Day and the U.S. Surgeon General's Family History Initiative. DNA Day is an annual opportunity to educate students about genetics and genomics and to use this cutting edge field to spark their interest in science. NHGRI staff collaborates with researchers, professional and lay advocacy organizations, and teachers to reach students across the country. This is achieved through school visits, teacher training, and a live web-based chatroom where students can post questions to NHGRI researchers and staff. The U.S. Surgeon General's Family History Initiative is a coordinated multi-agency effort to encourage all American families to learn more about their family health history and to employ it in preventive health care. To make gathering this information easier, an improved version of the online web based tool, "My Family Health Portrait," as well as paper versions of the tool have been made available in both English and Spanish. To expand the initiative's reach and impact, NHGRI annually selects a group for a one-year demonstration project grant to educate and engage health care providers and patient communities about the importance of family history. NHGRI also plays a lead role in the initiative's annual National Family History Day activities.

Budget Policy: The FY 2009 budget estimate for research management and support is $18.745 million, an increase of $277,000 or +1.5 percent from the FY 2008 Enacted.

NHGRI plans for FY 2009 to continue to develop ongoing initiatives for which the Office of the Director provides leadership and financial support for programs, including National DNA Day and the US Surgeon General's Family History Initiative. NHGRI will continue to enhance its community engagement and outreach programs to the public targeting underserved communities within the United States. NHGRI will expand its efforts in exposing students to careers in genomics and genetics research by developing new resources for teachers and students. In addition, NHGRI plans to enhance its programs to provide high quality, current and accessible genetic information to individuals seeking health information.

NIH COMMON FUND ROADMAP INITIATIVES

The NHGRI is the lead Institute for the Connectivity Map supported through the NIH Common Fund. In addition, the NHGRI is a co-lead for the Molecular Libraries initiatives, including: 1) NIH Chemical Genomics Center, 2) Cheminformatics Computing Centers (virtual synthesis, virtual screening, other applications, and R&D on new tools), and 3) Robotics/Instrumentation Technology Development, also supported through the NIH Common Fund. Finally, the NHGRI also co-leads the new Human Microbiome Project, also supported through the NIH Common Fund.

NATIONAL INSTITUTES OF HEALTH
National Human Genome Research Institute

Budget Authority by Object

	FY 2008 Enacted	FY 2009 Estimate	Increase or Decrease
Total compensable workyears:			
Full-time employment	299	301	2
Full-time equivalent of overtime and holiday hours	1	1	0
Average ES salary	$158,500	$158,500	$0
Average GM/GS grade	12.1	12.1	0.0
Average GM/GS salary	$87,634	$88,949	$1,315
Average salary, grade established by act of July 1, 1944 (42 U.S.C. 207)	$87,813	$89,131	$1,318
Average salary of ungraded positions	126,232	128,126	1,894
OBJECT CLASSES	FY 2008 Enacted	FY 2009 Estimate	Increase or Decrease
Personnel Compensation:			
11.1 Full-time permanent	$15,837,000	$16,629,000	$792,000
11.3 Other than full-time permanent	11,474,000	11,876,000	402,000
11.5 Other personnel compensation	635,000	657,000	22,000
11.7 Military personnel	294,000	304,000	10,000
11.8 Special personnel services payments	5,016,000	5,016,000	0
Total, Personnel Compensation	33,256,000	34,482,000	1,226,000
12.0 Personnel benefits	8,026,000	8,307,000	281,000
12.2 Military personnel benefits	158,000	164,000	6,000
13.0 Benefits for former personnel	0	0	0
Subtotal, Pay Costs	**41,440,000**	**42,953,000**	**1,513,000**
21.0 Travel and transportation of persons	2,053,000	2,053,000	0
22.0 Transportation of things	196,000	196,000	0
23.1 Rental payments to GSA	1,000	1,000	0
23.2 Rental payments to others	28,000	28,000	0
23.3 Communications, utilities and miscellaneous charges	703,000	703,000	0
24.0 Printing and reproduction	91,000	91,000	0
25.1 Consulting services	836,000	837,000	1,000
25.2 Other services	5,082,000	5,085,000	3,000
25.3 Purchase of goods and services from government accounts	43,031,000	43,904,000	873,000
25.4 Operation and maintenance of facilities	319,000	319,000	0
25.5 Research and development contracts	21,483,000	21,483,000	0
25.6 Medical care	954,000	955,000	1,000
25.7 Operation and maintenance of equipment	2,107,000	2,107,000	0
25.8 Subsistence and support of persons	0	0	0
25.0 Subtotal, Other Contractual Services	**73,812,000**	**74,690,000**	**878,000**
26.0 Supplies and materials	10,140,000	10,127,000	(13,000)
31.0 Equipment	4,742,000	4,736,000	(6,000)
32.0 Land and structures	0	0	0
33.0 Investments and loans	0	0	0
41.0 Grants, subsidies and contributions	353,567,000	352,294,000	(1,273,000)
42.0 Insurance claims and indemnities	0	0	0
43.0 Interest and dividends	6,000	6,000	0
44.0 Refunds	0	0	0
Subtotal, Non-Pay Costs	**445,339,000**	**444,925,000**	(414,000)
Total Budget Authority by Object	**486,779,000**	**487,878,000**	1,099,000

Includes FTEs which are reimbursed from the NIH Roadmap for Medical Research

NATIONAL INSTITUTES OF HEALTH
National Human Genome Research Institute

Salaries and Expenses

OBJECT CLASSES	FY 2008 Enacted	FY 2009 Estimate	Increase or Decrease
Personnel Compensation:			
Full-time permanent (11.1)	$15,837,000	$16,629,000	$792,000
Other than full-time permanent (11.3)	11,474,000	11,876,000	402,000
Other personnel compensation (11.5)	635,000	657,000	22,000
Military personnel (11.7)	294,000	304,000	10,000
Special personnel services payments (11.8)	5,016,000	5,016,000	0
Total Personnel Compensation (11.9)	**33,256,000**	**34,482,000**	**1,226,000**
Civilian personnel benefits (12.1)	8,026,000	8,307,000	281,000
Military personnel benefits (12.2)	158,000	164,000	6,000
Benefits to former personnel (13.0)	0	0	0
Subtotal, Pay Costs	**41,440,000**	**42,953,000**	**1,513,000**
Travel (21.0)	2,053,000	2,053,000	0
Transportation of things (22.0)	196,000	196,000	0
Rental payments to others (23.2)	28,000	28,000	0
Communications, utilities and miscellaneous charges (23.3)	703,000	703,000	0
Printing and reproduction (24.0)	91,000	91,000	0
Other Contractual Services:			
Advisory and assistance services (25.1)	836,000	837,000	1,000
Other services (25.2)	5,082,000	5,085,000	3,000
Purchases from government accounts (25.3)	43,031,000	43,904,000	873,000
Operation and maintenance of facilities (25.4)	319,000	319,000	0
Operation and maintenance of equipment (25.7)	2,107,000	2,107,000	0
Subsistence and support of persons (25.8)	0	0	0
Subtotal Other Contractual Services	**51,375,000**	**52,252,000**	**877,000**
Supplies and materials (26.0)	10,140,000	10,127,000	(13,000)
Subtotal, Non-Pay Costs	64,586,000	65,450,000	864,000
Total, Administrative Costs	**106,026,000**	**108,403,000**	**2,377,000**

NATIONAL INSTITUTES OF HEALTH
National Human Genome Research Institute

Authorizing Legislation

	PHS Act/ Other Citation	U.S. Code Citation	2008 Amount Authorized	FY 2008 Enacted	2009 Amount Authorized	FY 2009 Budget Estimate
Research and Investigation	Section 301	42§241	Indefinite	$486,779,000	Indefinite	$487,878,000
National Human Genome Research Institute	Section 402(a)	42§281	Indefinite		Indefinite	
Total, Budget Authority				486,779,000		487,878,000

NATIONAL INSTITUTES OF HEALTH
National Human Genome Research Institute

Appropriations History

Fiscal Year	Budget Estimate to Congress	House Allowance	Senate Allowance	Appropriation 1/
2000	271,536,000 2/	308,012,000	337,322,000	337,322,000
Rescission				-1,795,000
2001	353,427,000 2/	386,410,000	385,888,000	382,384,000
Rescission				-192,000
2002	426,739,000	423,454,000	440,448,000	429,515,000
Rescission				-757,000
2003	458,182,000	458,182,000	468,037,000	468,037,000
Rescission				-3,042,000
2004	478,072,000	478,072,000	482,372,000	482,222,000
Rescission				-3,149,000
2005	492,670,000	492,670,000	496,400,000	492,670,000
Rescission				-4,062,000
2006	490,959,000	490,959,000	502,804,000	490,959,000
Rescission				-4,910,000
2007	482,942,000	482,942,000	486,315,000	486,491,000
2008	484,436,000	493,996,000	497,031,000	495,434,000
Rescission				-8,655,000
2009	487,878,000			

1/ Reflects enacted supplementals, rescissions, and reappropriations.
2/ Excludes funds for HIV/AIDS research activities consolidated in the NIH Office of AIDS Research.

NATIONAL INSTITUTES OF HEALTH
National Human Genome Research Institute

Details of Full-Time Equivalent Employment (FTEs)

OFFICE/DIVISION	FY 2007 Actual	FY 2008 Enacted	FY 2009 Estimate
Office of the Director	9	15	15
Office of Administrative Management	19	20	20
Office of Policy, Communication and Education	9	11	12
Division of Intramural Research	217	219	220
Division of Extramural Research	32	34	34
Total	286	299	301
Includes FTEs which are reimbursed from the NIH Roadmap for Medical Research			
FTEs supported by funds from Cooperative Research and Development Agreements	(2)	(2)	(2)

FISCAL YEAR	Average GM/GS Grade
2005	11.8
2006	11.8
2007	12.0
2008	12.1
2009	12.1

NATIONAL INSTITUTES OF HEALTH
National Human Genome Research Institute

Detail of Positions

GRADE	FY 2007 Actual	FY 2008 Enacted	FY 2009 Estimate
Total, ES Positions	2	2	3
Total, ES Salary	320,079	334,452	502,812
GM/GS-15	22	22	22
GM/GS-14	15	20	20
GM/GS-13	37	42	42
GS-12	43	44	44
GS-11	23	23	23
GS-10	3	3	3
GS-9	8	8	8
GS-8	11	11	11
GS-7	5	5	5
GS-6	1	1	1
GS-5	0	0	0
GS-4	0	0	0
GS-3	1	1	1
GS-2	0	0	0
GS-1	0	0	0
Subtotal	169	180	180
Grades established by Act of July 1, 1944 (42 U.S.C. 207):			
Assistant Surgeon General	0	0	0
Director Grade	3	3	3
Senior Grade	0	0	0
Full Grade	1	1	1
Senior Assistant Grade	1	1	1
Assistant Grade	0	0	0
Subtotal	5	5	5
Ungraded	138	140	141
Total permanent positions	195	0	0
Total positions, end of year	314	327	329
Total full-time equivalent (FTE) employment, end of year	286	299	301
Average ES salary	160,040	158,500	158,500
Average GM/GS grade	12.0	12.1	12.1
Average GM/GS salary	84,779	87,634	88,949

Includes FTEs which are reimbursed from the NIH Roadmap for Medical Research.

NATIONAL INSTITUTES OF HEALTH
National Human Genome Research Institute

New Positions Requested

	FY 2009		
	Grade	Number	Annual Salary
Staff Scientist	Title 42	1	$110,000
Director of Policy, Communication & Education	SES	1	158,500
Total Requested		2	