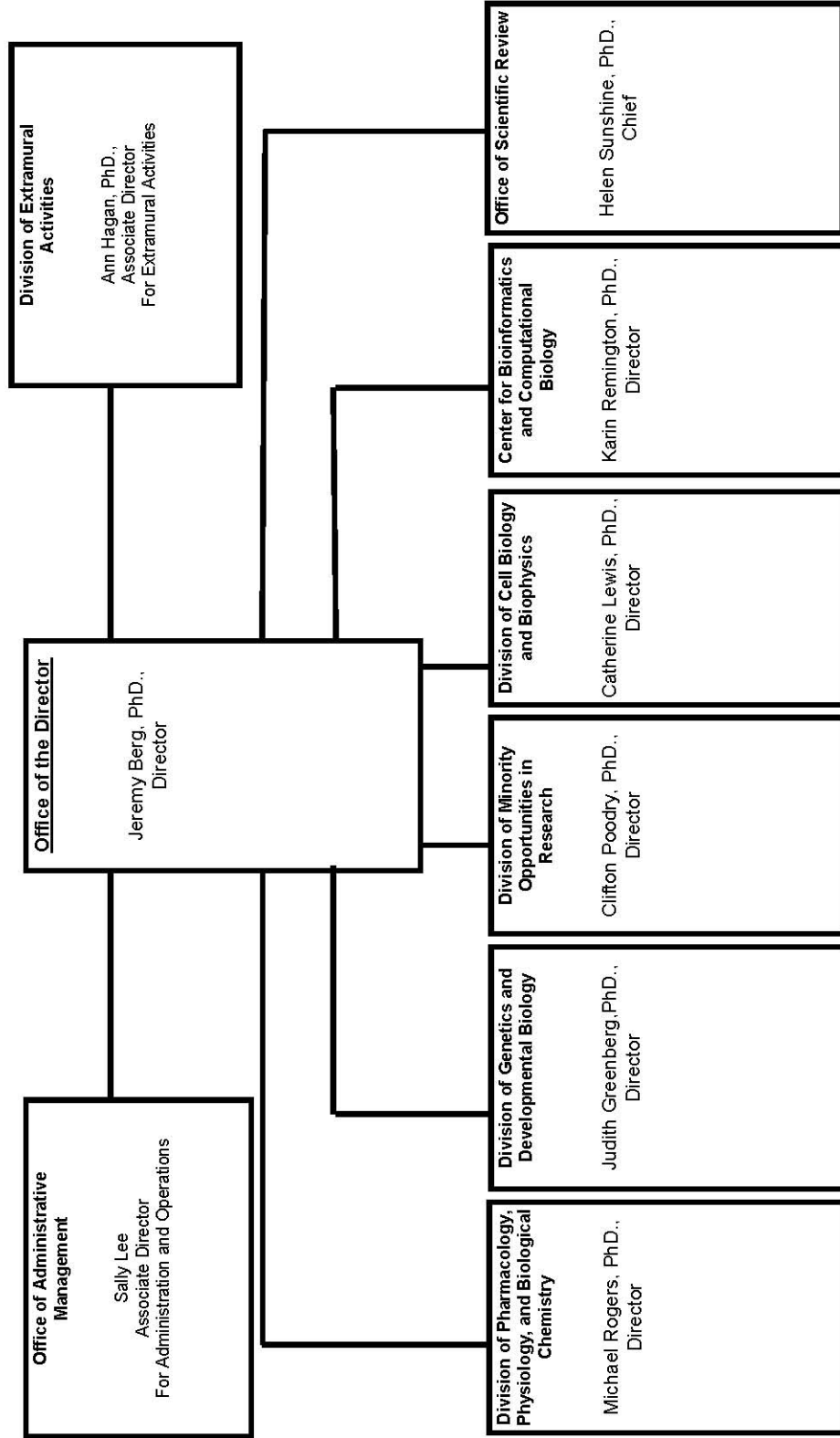


DEPARTMENT OF HEALTH AND HUMAN SERVICES  
NATIONAL INSTITUTES OF HEALTH  
National Institute of General Medical Sciences (NIGMS)

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NATIONAL INSTITUTES OF HEALTH  
National Institute of General Medical Sciences

Organization Structure



**NATIONAL INSTITUTES OF HEALTH**

National Institute of General Medical Sciences

For carrying out section 301 and title IV of the Public Health Services Act with respect to general medical sciences [~~\$1,997,801,000~~] **\$2,023,677,000** (Department of Health and Human Services Appropriation Act, 2009)

**National Institutes of Health  
National Institute of General Medical Sciences**

**Amounts Available for Obligation 1/**

Source of Funding	FY 2008 Actual	FY 2009 Estimate	FY 2010 PB
Appropriation	\$1,970,228,000	\$1,997,801,000	\$2,023,677,000
Type 1 Diabetes	0	0	0
Rescission	-34,420,000	0	0
Supplemental	10,296,000	0	0
Subtotal, adjusted appropriation	1,946,104,000	1,997,801,000	2,023,677,000
Real transfer under Director's one-percent transfer authority (GEI)	-3,228,000	0	0
Real transfer to the Global Fund to fight HIV/AIDS, Malaria and Tuberculosis	0	0	0
Comparative transfer to/from (specify)	0	0	0
Comparative transfer under Director's one-percent transfer authority (GEI)	3,228,000	0	0
Comparative transfer to the Global Fund to fight HIV/AIDS, Malaria and Tuberculosis	0	0	0
Comparative transfer from DHHS for Autism	0	0	0
Subtotal, adjusted budget authority	1,946,104,000	1,997,801,000	2,023,677,000
Unobligated balance, start of year	0	0	0
Unobligated balance, end of year	0	0	0
Subtotal, adjusted budget authority	1,946,104,000	1,997,801,000	2,023,677,000
Unobligated balance lapsing	-93,000	0	0
Total obligations	1,946,011,000	1,997,801,000	2,023,677,000

1/ Excludes the following amounts for reimbursable activities carried out by this account:

FY 2008 - \$1,336,000    FY 2009 - \$3,823,000    FY 2010 - \$3,854,000

**NATIONAL INSTITUTES OF HEALTH**  
**National Institute of General Medical Sciences**  
(Dollars in Thousands)

Budget Mechanism - Total

MECHANISM	FY 2008 Actual		FY 2009 Estimate		FY 2010 PB		Change	
	No.	Amount	No.	Amount	No.	Amount	No.	Amount
<b>Research Grants:</b>								
<u>Research Projects:</u>								
Noncompeting	2,930	\$979,174	2,928	\$1,036,240	2,873	\$1,044,893	(55)	\$8,653
Administrative supplements	(205)	12,314	(33)	2,000	(33)	2,000	(0)	0
Competing:								
Renewal	474	177,281	499	190,647	506	197,063	7	6,416
New	461	152,388	376	126,964	375	129,076	(1)	2,112
Supplements	2	267	1	137	1	140	0	3
Subtotal, competing	937	329,936	876	317,748	882	326,279	6	8,531
Subtotal, RPGs	3,867	1,321,424	3,804	1,355,988	3,755	1,373,172	(49)	17,184
SBIR/STTR	160	45,814	153	46,068	155	46,668	2	600
Subtotal, RPGs	4,027	1,367,238	3,957	1,402,056	3,910	1,419,840	(47)	17,784
<u>Research Centers:</u>								
Specialized/comprehensive	52	166,002	55	174,000	56	176,610	1	2,610
Clinical research	0	0	0	0	0	0	0	0
Biotechnology	0	460	0	753	0	764	0	11
Comparative medicine	0	292	0	100	0	102	0	2
Research Centers in Minority Institutions	0	0	0	0	0	0	0	0
Subtotal, Centers	52	166,754	55	174,853	56	177,476	1	2,623
<u>Other Research:</u>								
Research careers	96	18,702	96	19,500	97	19,793	1	293
Cancer education	0	0	0	0	0	0	0	0
Cooperative clinical research	0	0	0	0	0	0	0	0
Biomedical research support	0	0	0	0	0	0	0	0
Minority biomedical research support	252	99,468	252	99,468	256	100,960	4	1,492
Other	115	20,871	106	20,871	108	21,184	2	313
Subtotal, Other Research	463	139,041	454	139,839	461	141,937	7	2,098
<b>Total Research Grants</b>	<b>4,542</b>	<b>1,673,033</b>	<b>4,466</b>	<b>1,716,748</b>	<b>4,427</b>	<b>1,739,253</b>	<b>(39)</b>	<b>22,505</b>
<u>Research Training:</u>								
Individual awards	540	22,732	540	22,911	545	23,140	5	229
Institutional awards	3,763	169,241	3,802	173,164	3,840	174,896	38	1,732
Total, Training	4,303	191,973	4,342	196,075	4,385	198,036	43	1,961
Research & development contracts (SBIR/STTR)	20 (0)	25,416 (106)	24 (0)	28,015 (106)	25 (0)	28,435 (106)	1 (0)	420 (0)
Intramural research	10	2,519	10	2,577	10	2,616	0	39
Research management and support	127	53,163	124	54,386	127	55,337	3	951
Construction		0		0		0		0
Buildings and Facilities		0		0		0		0
Total, NIGMS	137	1,946,104	134	1,997,801	137	2,023,677	3	25,876

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

**NATIONAL INSTITUTES OF HEALTH**  
**National Institute of General Medical Sciences**  
**BA by Program**  
(Dollars in thousands)

<u>Extramural Research</u> Detail:	FY 2006 Actual		FY 2007 Actual		FY 2008 Actual		FY 2008 Comparable		FY 2009 Estimate		FY 2010 PB		Change	
	FTEs	Amount	FTEs	Amount	FTEs	Amount	FTEs	Amount	FTEs	Amount	FTEs	Amount	FTEs	Amount
Cell Biology and Biophysics		\$562,159		\$589,856		\$558,114		\$558,114		\$574,159		\$582,034		7,875
Genetics and Developmental Biology		503,437		487,307		497,698		500,926		515,327		522,396		7,069
Pharmacology, Physiology and Biological Chemistry		426,391		399,127		413,595		413,595		425,485		431,322		5,837
Bioinformatics and Computational Biology		82,159		92,356		103,605		103,605		106,584		108,046		1,462
Minority Opportunities In Research		125,099		125,697		122,209		122,209		123,208		123,890		682
Training		185,059		188,606		191,973		191,973		196,075		198,036		1,961
<b>Subtotal, Extramural</b>		1,884,304		1,882,949		1,887,194		1,890,422		1,940,838		1,965,724		24,886
<b>Intramural research</b>	9	2,507	10	2,479	10	2,519	10	2,519	10	2,577	10	2,616	0	39
<b>Res. management &amp; support</b>	116	47,232	123	50,197	127	53,163	127	53,163	124	54,386	127	55,337	3	951
<b>TOTAL</b>	125	1,934,043	133	1,935,625	137	1,942,876	137	1,946,104	134	1,997,801	137	2,023,677	3	25,876

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

## **Major Changes in the Fiscal Year 2010 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 2010 budget request for NIGMS, which is \$25.876 million more than the FY 2009 estimate, for a total of \$2,023.677 million.

Research Project Grants (+\$17.184 million; total \$1,373.172 million): NIGMS will support a total of 3,755 Research Project Grant (RPG) awards in FY 2010. Noncompeting RPGs will decrease by 55 awards. Competing RPGs will increase by 6 awards and \$8.531 million. The NIH budget policy for RPGs in FY 2010 is to provide for a 2% inflationary increase in noncompeting awards and a 2% increase in average cost for competing RPGs.

**NATIONAL INSTITUTES OF HEALTH**  
**National Institute of General Medical Sciences**  
**Summary of Changes**

FY 2009 estimate		\$1,997,801,000	
FY 2010 estimated budget authority		2,023,677,000	
Net change		25,876,000	
CHANGES	2009 Current		
	Estimate Base	Change from Base	
	Budget	FTEs	Budget
	Authority	Authority	Authority
	FTEs	FTEs	Authority
A. Built-in:			
1. Intramural research:			
a. Annualization of January			
2009 pay increase	\$1,444,000		\$17,000
b. January FY 2010 pay increase	1,444,000		22,000
c. Zero less days of pay	1,444,000		0
d. Payment for centrally furnished services	156,000		3,000
e. Increased cost of laboratory supplies, materials, and other expenses	977,000		16,000
Subtotal			58,000
2. Research management and support:			
a. Annualization of January			
2009 pay increase	\$17,882,000		\$214,000
b. January FY 2010 pay increase	17,882,000		268,000
c. Zero less days of pay	17,882,000		0
d. Payment for centrally furnished services	14,620,000		292,000
e. Increased cost of laboratory supplies, materials, and other expenses	21,884,000		380,000
Subtotal			1,154,000
Subtotal, Built-in			1,212,000



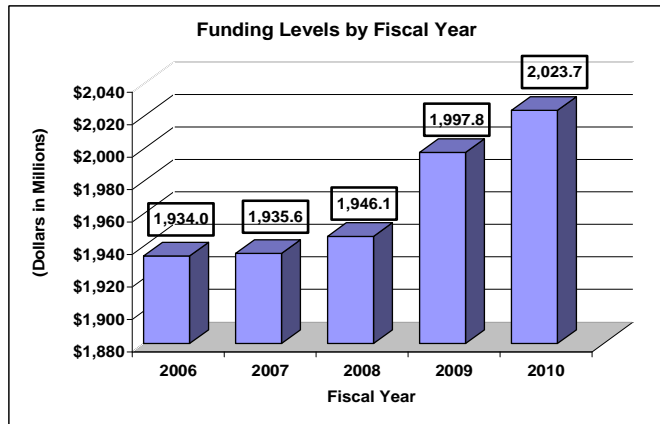
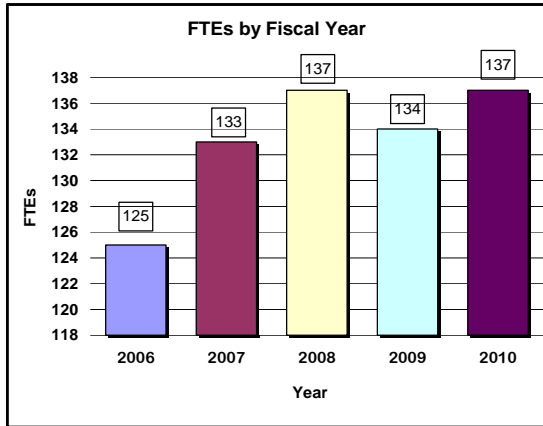
**NATIONAL INSTITUTES OF HEALTH**  
**National Institute of General Medical Sciences**

**Summary of Changes--continued**

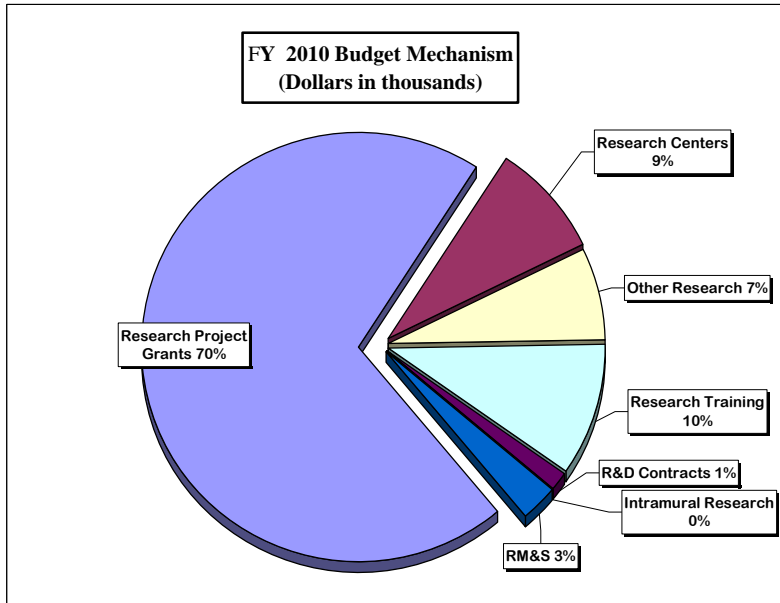
CHANGES	2009 Current Estimate Base		Change from Base	
	No.	Amount	No.	Amount
<b>B. Program:</b>				
1. Research project grants:				
a. Noncompeting	2,928	\$1,038,240,000	(55)	\$8,653,000
b. Competing	876	317,748,000	6	8,531,000
c. SBIR/STTR	153	46,068,000	2	600,000
Total	3,957	1,402,056,000	(47)	17,784,000
2. Research centers	55	174,853,000	1	2,623,000
3. Other research	454	139,839,000	7	2,098,000
4. Research training	4,342	196,075,000	43	1,961,000
5. Research and development contracts	24	28,015,000	1	420,000
Subtotal, extramural				24,886,000
6. Intramural research	10	2,577,000	0	(19,000)
7. Research management and support	124	54,386,000	3	(203,000)
8. Construction		0		0
9. Buildings and Facilities		0		0
Subtotal, program		1,997,801,000		24,664,000
Total changes	134		3	25,876,000

## Fiscal Year 2010 Budget Graphs

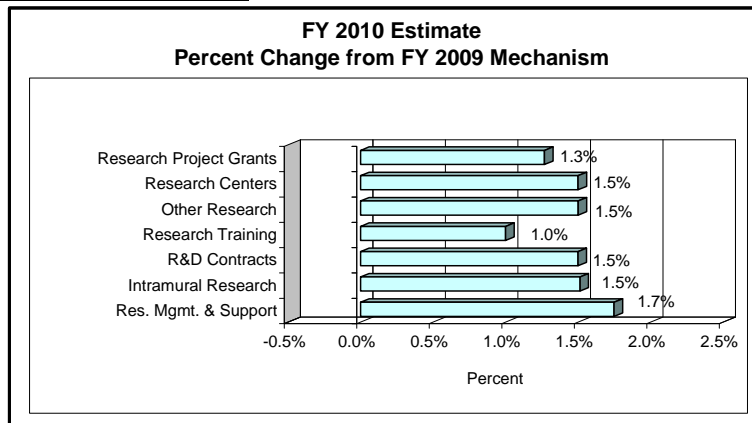
### History of Budget Authority and FTEs:



### Distribution by Mechanism:



### Change by Selected Mechanisms:



## Justification

### National Institute of General Medical Sciences

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

Budget Authority:

	FY 2008	FY 2009	FY 2009	FY 2010	FY 2010 +/-
	<u>Appropriation</u>	<u>Omnibus</u>	<u>Recovery Act</u>	<u>President's Budget</u>	<u>2009 Omnibus</u>
<u>BA</u>	\$1,946,104,000	\$1,997,801,000	\$505,188,000	\$2,023,677,000	\$25,876,000
<u>FTE</u>	137	134		137	3

This document provides justification for the Fiscal Year (FY) 2010 activities of the National Institute of General Medical Sciences (NIGMS), including NIH/AIDS activities. Details of the FY 2010 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.

In FY 2009, a total of \$505,188,000 American Recovery and Reinvestment Act (ARRA) funds were transferred from the Office of the Director. These funds will be used to support scientific research opportunities that help support the goals of the ARRA. The ARRA allows NIH to execute these funds via any NIH funding mechanism. Funds are available until September 30, 2010. These funds are not included in the FY 2009 Omnibus amounts reflected in this document.

### DIRECTOR'S OVERVIEW

The past year's science and health advances, made possible by funding from the National Institute of General Medical Sciences (NIGMS), canvass a diverse array of biomedicine. I believe it is truer than ever that giving scientists the freedom to explore the unknown allows them to make important, and often serendipitous, connections. These links are key to understanding the ingredients of good health and the paths of disease.

Basic researchers, who by nature cross disciplines in their pursuit of knowledge, play an increasingly important role in modern biomedicine. A clear example came in April 2008, when a NIGMS grantee at the Massachusetts Institute of Technology helped solve a case involving contaminated medicine. In this scenario, public health officials discovered tainted batches of heparin, an effective and inexpensive medicine that doctors use to control blood clotting. Teaming with researchers from academia, industry, and the Food and Drug Administration, the grantee examined the structures of molecules within contaminated batches of the drug and developed a rapid and sensitive

method to detect the impurity. The NIGMS grantee also showed that the contaminants could be responsible for the adverse reactions in humans. This innovative strategy is likely to lead to new screening methods for detecting impurities in other types of medicines.

Another important breakthrough this past year came from the Institute's consistent support of research on the basic biology of stem cells. In late 2007, a NIGMS grantee from the University of Wisconsin-Madison, reprogrammed ordinary skin cells to become induced pluripotent stem cells. These "iPS" cells appear to look and act, in most regards, just like human embryonic stem cells, which are capable of changing into any of the body's more than 200 cell types. In the short time since this pioneering work, other scientists have created patient-specific cells that enable the study of diseases at a much more precise level than ever before possible. For example, just recently another NIGMS grantee from the University of North Carolina, Chapel Hill, crafted iPS cells to make insulin, a discovery with obvious implications for treating diabetes. Continued, diversified support of stem cell research will undoubtedly speed progress toward achieving personalized therapies for many conditions.

The groundbreaking discovery of microRNAs shattered current dogma that proteins were the sole regulators of gene control. This research conducted by two long-time NIGMS grantees, in addition to a scientist from the U.K., was awarded the 2008 Albert Lasker Basic Medical Research Award, known to many as "America's Nobel Prize," as this discovery will continue to fuel scientists' efforts to understand and interpret the language of the human genome.

I would also like to showcase the NIH EUREKA (Exceptional, Unconventional Research Enabling Knowledge Acceleration) program that will help investigators test novel, often unconventional hypotheses or tackle major methodological or technical challenges. NIGMS has taken the lead for NIH in establishing the EUREKA awards and currently, nine NIH Institutes and Centers are participating in this program. Last year's call for EUREKA proposals yielded many innovative ideas with the potential for extraordinarily significant impact on many areas of science.

A diverse research portfolio, such as the examples provided above, provides the best opportunity for the scientific community to catalyze progress toward improving health and curing disease. In addition to supporting innovative researchers, the Institute continues to support coordinated research programs that comprise large groups of researchers spanning many institutions. In April 2008, NIGMS led the creation of the Global Alliance for Pharmacogenomics, a partnership between NIH and the Center for Genomic Medicine in Japan. U.S. scientists joining the global initiative are members of the NIH Pharmacogenetics Research Network (PGRN), a nationwide consortium of research groups investigating how genes affect an individual's response to medicines. This new partnership offers the chance to share resources and expertise toward speeding scientific knowledge in this key area that is highly relevant to public health.

Advantages of large-scale science initiatives like the PGRN and others, such as the Protein Structure Initiative (PSI) which establishes an efficient pipeline for determining the three-dimensional shapes of proteins, create new mechanisms for sharing the resources it has developed with the scientific community. We make sure that instrumentation, data, and resources developed at NIGMS-funded large-scale science facilities are made broadly available to all scientists. This past year, NIGMS established both a Structural Genomics Knowledgebase and a Materials Repository to transform products of the PSI into knowledge important for understanding living systems and disease.

Last year's intensive planning efforts included meetings with the scientific community and other stakeholders, and culminated in the January 2008 publication of *Investing in Discovery: National Institute of General Medical Sciences Strategic Plan 2008-2012*. In addition to sustaining our investment in individual-investigator driven basic research and collaborative science, we have committed a substantial effort toward addressing workforce development, a key component of the NIGMS mission. We believe that workforce diversity is fundamentally a systems issue and are currently identifying ways to synergize training and diversity across Institute programs. This past year, we also issued a call for research to investigate various interventions for boosting careers in biomedical and behavioral research, with the goal of providing a strong evidence base for those interventions that effectively promote the pursuit of biomedical research career paths.

## **FY 2010 Justification by Activity Detail**

**Overall Budget Policy:** Investigator-initiated research projects and early career investigator research are the Institute's highest priorities. Developing a strong scientific workforce is a core element of the NIGMS mission. In addition to our research funding activities, we support this goal through a range of training programs.

In FY 2010, NIGMS also plans to increase cancer research 4.4 percent over FY 2009. Additionally, Nanotechnology research will increase 1.5 percent over the estimated FY 2009 amount.

Intramural Research and Research Management and Support receive modest increases to help offset the cost of pay and other increases. NIGMS will continue to support new investigators and to maintain an adequate number of competing RPGs.

## **Program Descriptions and Accomplishments**

**Cell Biology and Biophysics:** The Cell Biology and Biophysics (CBB) program fosters the study of cells and their components. Physics- and chemistry-based technological advances, driven by new types of microscopy, structural biology tools, and many other novel imaging techniques, have facilitated our understanding of life at the level of molecules and atoms. This basic research promotes the development of precise, targeted therapies, and diagnostics for a range of diseases.

In FY 2008, the program's Protein Structure Initiative (PSI) continued to make protein structure determination faster, easier, and cheaper. The average cost per structure is now \$57 thousand compared to \$94 thousand in FY 2006 and \$138 thousand in FY 2005. In FY 2009, the PSI entered a new phase of funding that will extend to 2015. This third, "PSI:Biology" phase will expend 70 percent of its effort on enabling the scientific community to make use of PSI resources to solve problems with high medical or biological significance. In FY 2009 and FY 2010, CBB will also continue to fund research in optical imaging; the fruits of these efforts will make it easier for researchers to study cellular structures and to better understand the basic functions of normal and diseased cells..

Budget Policy: The FY 2010 budget estimate for this program is \$582.034 million, an increase of \$7.875 million and 1.4 percent over the FY 2009 estimate. The majority of CBB funds will be used to support investigator-initiated research projects in cell biology, biophysics, cellular imaging, and structural biology. In FY 2010, CBB will continue to support the Protein Structure Initiative (PSI), a 10-year project begun in 2000 that aims to make protein structure determination a rapid and inexpensive enterprise. CBB will also use FY 2010 funds to support programs in optical imaging and an AIDS-related structural biology program.

**Genetics and Developmental Biology:** The mission of the Genetics and Developmental Biology (GDB) program is to promote basic research that aims to understand fundamental mechanisms of inheritance and development. This research underlies more targeted projects supported by other NIH institutes and centers. Much of GDB's investigator-initiated research is performed in model organisms, an approach that continues to deepen our understanding of common diseases and diverse behaviors.

In FY 2008, GDB increased its support for research on the basic biology of stem cells by funding three new program project grants (two were funded last year). Furthermore, to rapidly exploit the potential of induced pluripotent stem (iPS) cells, GDB announced the availability of administrative supplements targeted at NIGMS grantees who wish to extend their ongoing projects by using iPS cells as models to study differentiation and development. In FY 2008, NIGMS funded four iPS supplements. In FY 2009, GDB will fund administrative supplements from NIGMS grantees who wish to extend their ongoing projects by using iPS cells as models to study differentiation and development. In FY 2010, GDB will continue to support an initiative to fund systems-based approaches for understanding how genes that contribute to common diseases interact with each other and with external influences to bring about their effects.

Budget Policy: The FY 2010 budget estimate for this program is \$522.396 million, an increase of \$7.069 million and 1.4 percent over the FY 2009 estimate. As with FY 2009, most GDB expenditures will support individual investigators seeking fundamental knowledge about life processes.

In FY 2010, GDB will continue to support an initiative to fund systems-based approaches for understanding how genes that contribute to common diseases interact with each other and with external influences to bring about their effects.

**Program Portrait: MicroRNAs--Little Molecules, Big Impact**

FY 2009 Level: \$1.447 million

FY 2010 Level: \$1.491 million

Change: \$0.044 million

The 2008 Albert Lasker Award for Basic Medical Research was shared by three scientists for the discovery of microRNAs (miRNAs). The small size of these molecules belies their big impact on gene control in animals and plants. Two of the Lasker winners, Victor Ambros, Ph.D., of the University of Massachusetts Medical School in Worcester and Gary Ruvkun, Ph.D., of Harvard Medical School and Massachusetts General Hospital in Boston, are long-time NIGMS grantees. Their seminal work illuminating developmental processes in worms provided the first glimpse of how important miRNAs would turn out to be as gene controllers. Unlike messenger RNAs, miRNAs do not themselves make proteins. Rather, a miRNA matches up with a messenger RNA and either destroys it or impairs its ability to make protein. Although originally considered to be an oddity of worms, miRNAs are now known to be widespread in the living world, including in human beings. The discovery of miRNAs, along with gene-silencing RNA interference, or RNAi, has revolutionized scientists' ability to address key problems in biomedicine. MiRNAs, like RNAi, are vital for development, response to infection, and other body processes. Many NIGMS-supported researchers are avidly pursuing fundamental questions of miRNA biology to understand how miRNAs are produced and exert their important functions in tuning genes. What's more, this basic science discovery, fueled by investigator-initiated research, is leading to important advances in diagnosing and treating diseases. For example, researchers have found that certain miRNAs show up in particular tissues and become derailed in cancer. Thus, miRNA screening promises to add an important molecular diagnostic tool for finding tumors and for identifying the tissue of origin of cancers that have spread throughout the body. Clinical studies with cancer patients have demonstrated that miRNA profiles can predict disease progression and thus can help doctors determine the most appropriate therapies. In very recent work, researchers have uncovered tantalizing clues that miRNAs may also control stem cells by impacting their ability to keep dividing and to make many different cell types. Tailoring miRNAs for use in specific tissues of the body could become an important part of making stem cells useful for regenerative medicine. Like RNAi, the discovery of miRNAs is an example of how the NIGMS investment in basic research in a model organism--in this case, research on development in worms--has sparked an explosion of findings that are poised to make important contributions to personalized medicine.

**Pharmacology, Physiology, and Biological Chemistry:** The mission of the Pharmacology, Physiology, and Biological Chemistry (PPBC) program is to support fundamental research in chemistry, biochemistry, pharmacology, and physiology that contributes to understanding human biology in health and disease, and that generates knowledge for new diagnostics and therapeutics. PPBC funds the development of new chemistry, understanding of biochemical processes, and the discovery of new pharmacological principles. The program also funds research that explores clinical issues involving whole-body responses in important public health areas such as traumatic injury, burns, wound healing, and anesthesia.

In FY 2008, PPBC led the creation of the Global Alliance for Pharmacogenomics, a partnership between NIH and the Center for Genomic Medicine in Japan. U.S. scientists joining the global initiative are members of the NIH Pharmacogenetics Research Network, a PPBC-led consortium of research groups that study how genes affect an

individual's response to medicines. In FY 2009, PPBC continued support of five Centers in Chemical Methodology and Library Development that encourage technology development for chemical libraries of greater diversity than currently possible. Also in FY 2009, the program will fund five awards to enhance the study of processes mediated by sugar molecules attached to cell surfaces carbohydrates, in response to a funding solicitation in this area.

**Budget Policy:** The FY 2010 budget estimate for this program is \$431.322 million, an increase of \$5.837 million and 1.4 percent over the FY 2009 estimate. PPBC will continue to emphasize the support of investigator-initiated research grants. In FY 2010, the Pharmacogenetics Research Network, which is working toward promoting the goal of personalized medicine, will advance with the addition of genome-wide association studies through national and international collaborations.

**Bioinformatics and Computational Biology:** The Center for Bioinformatics and Computational Biology (CBCB) supports research that draws expertise from mathematics, statistics, computer science, engineering, and physics to answer problems in biomedicine. CBCB emphasizes integrated, systems approaches that pair computational studies with laboratory-based investigations. Other projects create virtual laboratories that address questions difficult to tackle in the laboratory. CBCB also encourages the development of tools and techniques to acquire, store, analyze, and visualize data.

In FY 2008, CBCB funded one new National Center for Systems Biology to advance the study of the complexity of biology and to train more scientists in this emerging field. This national effort, launched in 2002 and now totaling 10 centers, will broaden and enhance our understanding of the complex interactions between cells, tissues, and organisms. Already, the program is yielding important new insights, such as how bacteria can respond correctly to hundreds of incoming environmental signals. This work is an important first step toward understanding gene-environment interactions in animals and humans.

**Budget Policy:** The FY 2010 budget estimate for this program is \$108.046 million, an increase of \$1.462 million and 1.4 percent over the FY 2009 estimate. Highest priority will be given to investigator-initiated research, since this research will continue to yield information and tools for exploring complex biological systems. Two major initiatives employing FY 2010 funds are the Models of Infectious Disease Agent Study (MIDAS), which models the spread of infectious diseases, and the Centers for Systems Biology program, which currently funds 10 centers.

**Minority Opportunities in Research:** The mission of the Minority Opportunities in Research (MORE) program is to increase the number of underrepresented minorities performing biomedical and behavioral research. Through support provided to institutions with substantial minority enrollments, MORE's programs aim to strengthen the pipeline of minority researchers.



Research support for faculty at minority-serving institutions is now offered at three different levels, dependent upon the applicant's performance as a research scientist. Another major change is that these grants will now be administered by program officers across NIH who manage research in the scientific areas of the grants, rather than being administered solely by NIGMS staff. In FY 2008, MORE also funded a workshop grant to promote greater collaboration between biomedical and social scientists testing assumptions and hypotheses that undergird interventions for boosting careers in biomedical and behavioral research.

Budget Policy: The FY 2010 budget estimate for this program is \$123.890 million, an increase of \$682 thousand and .6 percent over the FY 2009 estimate. In FY 2010, NIGMS program staff will continue to reorganize existing programs to comply with recommendations issued from a working group of the NAGMS Council that advised the institute to rebalance its MORE portfolio. These efforts will place greater emphasis on student development and training. In FY 2010, MORE will also continue to examine the current state of research on interventions that influence the participation of underrepresented minorities in the biomedical and behavioral science.

**Program Portrait: the Institutional Research and Academic Career Development Award Program Strengthens Diversity**

FY 2009 Level: \$9.729 million  
FY 2010 Level: \$9.875 million  
Change: \$0.146 million

Key to building and sustaining a healthy biomedical research workforce is recruiting scientists who reflect the diversity of the U.S. population. As part of its overall strategy to enhance diversity in biomedicine, in 1999, NIGMS established the Institutional Research and Academic Career Development Award (IRACDA) program. IRACDA promotes linkages between minority-serving institutions (MSIs) and research-intensive institutions (RIIs) that can lead to further collaborations in research and teaching. The program's goals are to prepare young scientists for academic teaching and research careers while simultaneously enhancing teaching at MSIs. IRACDA fellows from RIIs are energetic, research-oriented teachers who develop and deliver contemporary curriculum at MSIs and serve as role models for MSI students. In this way, the program helps guide undergraduates, contributes to modernizing life-sciences curricula, and creates links between RII and MSI faculty. Among the IRACDA alumni is Andrea Morris, Ph.D., who in 1999 became the first African American woman to earn a Ph.D. in molecular biology from Princeton University. As an IRACDA fellow at Emory University, she did cutting-edge research while also teaching and forging connections with talented underrepresented faculty and students at neighboring Morehouse College. Today, as a tenure-track faculty member in the biology department at Haverford College, Morris is continuing to teach while also making significant contributions to the field of neural development. Last year, she received an NIH Career Development Award to Promote Diversity in Neuroscience. NIGMS designed IRACDA based on the premise that postdoctoral fellows who have a research-intensive experience and have an opportunity to teach will perform at least as well as traditional postdoctoral fellows, who primarily do research only. Preliminary results indicate that this is true, and that the relatively young program is already beginning to fulfill its goals.

**Research Training:** The Research Training program provides research training for the next generation of biomedical and behavioral scientists. In addition to training Ph.D. and M.D.-Ph.D. students, the program supports postdoctoral fellows through advanced and specialized training in basic, translational, and clinical research. This program also

features 12 predoctoral institutional training grants (T32s), which provide broad-based, multidisciplinary research training in several areas of biomedicine. This program also emphasizes diversity recruitment and the responsible conduct of research. Independent of institutional training grant activities, the program also supports the training of students and fellows working in individual-investigator laboratories, as well as mentored career development awards in six clinically related areas.

In FY 2008, the program established a new T32 training grant in molecular medicine and made three new awards in its recently established institutional training grant to support basic behavioral scientists (now in its second year). Also in FY 2008, the program launched the Community for Advanced Graduate Training, a Web-based tool to facilitate interactions and recruitment efforts between the NIGMS Minority Access to Research Careers (MARC) programs and the Institute's T32 programs. This "matching service" had approximately 75 percent registration by MARC students in its inaugural year, and NIGMS expects full participation in future years.

Budget Policy: The FY 2010 budget estimate for this program is \$198.036 million, an increase of \$1.961 million and 1.3 percent above the FY 2009 estimate. Maintaining a healthy pipeline of researchers is critical to maintaining the vibrancy of the scientific enterprise. NIGMS will continue to support rigorous research training programs that foster intellectual creativity, learning of quantitative skills, and exposure to topics in human health. In FY 2010, NIGMS will continue its new program supporting the research training of basic behavioral scientists and will promote its new molecular medicine program.

**Intramural:** The Institute has a small, but unique, intramural research program that supports postdoctoral research fellows for up to 3 years each. The Pharmacology Research Associate (PRAT) program provides scientists who have backgrounds in the basic or clinical sciences with multidisciplinary training in how drugs interact with living systems. For scientists who are already well-versed in pharmacology, the program offers experience in new fields. A number of former program participants have gone on to distinguished careers in academia, industry, and government, and one has won a Nobel Prize.

FY 2008 and FY 2009, PRAT scientists made several important advances. One researcher identified a key step in the way breast cancer cells become resistant to treatment. Another conducted an innovative genomic analysis of bacteria in healthy skin, contributing important information toward the understanding of the role of skin in health and disease. In FY 2009, the PRAT program received approximately twice the number of applications than it has received in the last five years. However, no significant funding changes are planned for FY 2009 and FY 2010.

Budget Policy: The FY 2010 budget estimate for the Intramural Research program is \$2.616 million, an increase of \$39 thousand and 1.5 percent over the FY 2009 estimate. NIGMS will continue its PRAT program, which provides training for outstanding fellows who conduct research in intramural laboratories of other NIH institutes and centers or in

Food and Drug Administration laboratories. After their NIH training, the PRAT fellows continue their careers as faculty at leading universities, in the pharmaceutical industry, or at government agencies, contributing pharmacology expertise and helping to meet national needs.

**Research Management and Support:** NIGMS Research Management and Support (RMS) activities provide administrative, budgetary, logistical, and scientific support in the review, award, and monitoring of research grants, training awards, and research and development contracts. RMS functions also encompass strategic planning, coordination, and evaluation of the Institute's programs, regulatory compliance, international coordination, and liaison with other Federal agencies, Congress, and the public.

In FY 2008, the Institute administered more than 4,500 research grants, 4,303 training grants, and 20 research and support contracts. To enhance the efficiency of grants administration functions, RMS funds continued to be used to develop and maintain an NIGMS information technology architecture that is integrated with NIH enterprise information systems. After engaging in intensive strategic planning efforts that included meetings with the scientific community and other outreach efforts, in January 2008 NIGMS published its strategic plan for 2008-2012. This document conveys the Institute's goals and values, as well as provides a framework for its decision-making. In FY 2009 and FY 2010, RMS funds will be used to support scientific meetings, conferences, and workshops to advance biomedical research. RMS funds will also be used to support information technology tools to facilitate the peer review process, conduct portfolio analysis, and assist with document management.

Budget Policy: The FY 2010 budget estimate for RMS is \$55.337 million, an increase of \$951 thousand and 1.7 percent over the FY 2009 estimate. In FY 2010, RMS funds will continue to support meetings with the biomedical and behavioral research community that will assist NIGMS in assigning priorities and setting its research agenda. To enhance the efficiency of grants administration functions, FY 2010 RMS funds will develop and maintain an NIGMS information technology architecture that is integrated with NIH enterprise information systems. In FY 2010, NIGMS will also promote innovations in administration and management to minimize paperwork and administrative burden, such as a more robust Intranet that will align with NIH-wide enterprise architecture.

**Common Fund:** NIGMS is the lead institute for the NIH Director's Pioneer Awards initiative and the New Innovator Awards initiative, and it co-leads the Structural Biology initiative, the Molecular Libraries and Imaging initiative, and the Bioinformatics and Computational Biology initiative supported through the NIH Common Fund. Additionally, NIGMS participates in the support of the Interdisciplinary Research initiative funded through the NIH Common fund.

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**Budget Authority by Object**

	FY 2009 Estimate	FY 2010 PB	Increase or Decrease
Total compensable workyears:			
Full-time employment	134	137	3
Full-time equivalent of overtime and holiday hours			0
Average ES salary	\$0	\$0	\$0
Average GM/GS grade	12.6	12.6	0.0
Average GM/GS salary	\$104,093	\$106,903	\$2,810
Average salary, grade established by act of July 1, 1944 (42 U.S.C. 207)	\$0	\$0	\$0
Average salary of ungraded positions	141,073	144,836	3,763
<b>OBJECT CLASSES</b>	<b>FY 2009 Estimate</b>	<b>FY 2010 Estimate</b>	<b>Increase or Decrease</b>
Personnel Compensation:			
11.1 Full-time permanent	\$8,763,000	\$9,210,000	\$447,000
11.3 Other than full-time permanent	6,019,000	6,314,000	295,000
11.5 Other personnel compensation	417,000	438,000	21,000
11.7 Military personnel	0	0	0
11.8 Special personnel services payments	370,000	380,000	10,000
<b>Total, Personnel Compensation</b>	<b>15,569,000</b>	<b>16,342,000</b>	<b>773,000</b>
12.0 Personnel benefits	3,757,000	3,945,000	188,000
12.2 Military personnel benefits	0	0	0
13.0 Benefits for former personnel	0	0	0
<b>Subtotal, Pay Costs</b>	<b>19,326,000</b>	<b>20,287,000</b>	<b>961,000</b>
21.0 Travel and transportation of persons	439,000	426,000	(13,000)
22.0 Transportation of things	22,000	21,000	(1,000)
23.1 Rental payments to GSA	0	0	0
23.2 Rental payments to others	0	0	0
23.3 Communications, utilities and miscellaneous charges	206,000	200,000	(6,000)
24.0 Printing and reproduction	226,000	219,000	(7,000)
25.1 Consulting services	299,000	289,000	(10,000)
25.2 Other services	7,958,000	7,667,000	(291,000)
25.3 Purchase of goods and services from government accounts	101,962,000	102,755,000	793,000
25.4 Operation and maintenance of facilities	95,000	92,000	(3,000)
25.5 Research and development contracts	789,000	789,000	0
25.6 Medical care	0	0	0
25.7 Operation and maintenance of equipment	137,000	133,000	(4,000)
25.8 Subsistence and support of persons	0	0	0
<b>25.0 Subtotal, Other Contractual Services</b>	<b>111,240,000</b>	<b>111,725,000</b>	<b>485,000</b>
26.0 Supplies and materials	134,000	130,000	(4,000)
31.0 Equipment	202,000	198,000	(4,000)
32.0 Land and structures	0	0	0
33.0 Investments and loans	0	0	0
41.0 Grants, subsidies and contributions	1,866,005,000	1,890,471,000	24,466,000
42.0 Insurance claims and indemnities	0	0	0
43.0 Interest and dividends	1,000	0	(1,000)
44.0 Refunds	0	0	0
<b>Subtotal, Non-Pay Costs</b>	<b>1,978,475,000</b>	<b>2,003,390,000</b>	<b>24,915,000</b>
<b>Total Budget Authority by Object</b>	<b>1,997,801,000</b>	<b>2,023,677,000</b>	<b>25,876,000</b>

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

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**Salaries and Expenses**

OBJECT CLASSES	FY 2009 Estimate	FY 2010 PB	Increase or Decrease
<b>Personnel Compensation:</b>			
Full-time permanent (11.1)	\$8,763,000	\$9,210,000	\$447,000
Other than full-time permanent (11.3)	6,019,000	6,314,000	295,000
Other personnel compensation (11.5)	417,000	438,000	21,000
Military personnel (11.7)	0	0	0
Special personnel services payments (11.8)	370,000	380,000	10,000
<b>Total Personnel Compensation (11.9)</b>	<b>15,569,000</b>	<b>16,342,000</b>	<b>773,000</b>
Civilian personnel benefits (12.1)	3,757,000	3,945,000	188,000
Military personnel benefits (12.2)	0	0	0
Benefits to former personnel (13.0)	0	0	0
<b>Subtotal, Pay Costs</b>	<b>19,326,000</b>	<b>20,287,000</b>	<b>961,000</b>
Travel (21.0)	439,000	426,000	(13,000)
Transportation of things (22.0)	22,000	21,000	(1,000)
Rental payments to others (23.2)	0	0	0
Communications, utilities and miscellaneous charges (23.3)	206,000	200,000	(6,000)
Printing and reproduction (24.0)	226,000	219,000	(7,000)
<b>Other Contractual Services:</b>			
Advisory and assistance services (25.1)	299,000	289,000	(10,000)
Other services (25.2)	7,958,000	7,667,000	(291,000)
Purchases from government accounts (25.3)	30,245,000	30,715,000	470,000
Operation and maintenance of facilities (25.4)	95,000	92,000	(3,000)
Operation and maintenance of equipment (25.7)	137,000	133,000	(4,000)
Subsistence and support of persons (25.8)	0	0	0
<b>Subtotal Other Contractual Services</b>	<b>38,734,000</b>	<b>38,896,000</b>	<b>162,000</b>
Supplies and materials (26.0)	133,000	130,000	(3,000)
<b>Subtotal, Non-Pay Costs</b>	<b>39,760,000</b>	<b>39,892,000</b>	<b>132,000</b>
<b>Total, Administrative Costs</b>	<b>59,086,000</b>	<b>60,179,000</b>	<b>1,093,000</b>

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**Authorizing Legislation**

	PHS Act/ Other Citation	U.S. Code Citation	2009 Amount Authorized	FY 2009 Estimate	2010 Amount Authorized	FY 2010 PB
Research and Investigation	Section 301	42§241	Indefinite	\$1,997,801,000	Indefinite	\$2,023,677,000
National Institute of General Medical Sciences	Section 402(a)	42§281	Indefinite		Indefinite	
<b>Total, Budget Authority</b>				<b>1,997,801,000</b>		<b>2,023,677,000</b>

**NATIONAL INSTITUTES OF HEALTH  
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**Appropriations History**

Fiscal Year	Budget Estimate to Congress	House Allowance	Senate Allowance	Appropriation 1/
2001	1,389,492,000 2/	1,548,313,000	1,554,176,000	1,535,823,000
Rescission				(125,000)
2002	1,720,206,000	1,706,968,000	1,753,465,000	1,725,263,000
Rescission				(124,000)
2003	1,874,243,000	1,874,243,000	1,853,584,000	1,859,084,000
Rescission				(12,084,000)
2004	1,923,133,000	1,923,133,000	1,917,033,000	1,916,333,000
Rescission				(11,495,000)
2005	1,959,810,000	1,959,810,000	1,975,500,000	1,959,810,000
Rescission				(15,743,000)
2006	1,955,170,000	1,955,170,000	2,002,622,000	1,955,170,000
Rescission				(19,552,000)
2007	1,923,481,000	1,923,481,000	1,934,888,000	1,935,618,000
Rescission				0
2008	1,941,462,000	1,966,019,000	1,978,601,000	1,970,228,000
Supplemental				10,296,000
Rescission				(34,420,000)
2009	1,937,690,000	2,004,295,000	1,991,609,000	1,997,801,000
Rescission				0
2010	2,023,677,000			

1/ Reflects enacted supplementals, rescissions, and reappropriations.

2/ Excludes funds for HIV/AIDS research activities consolidated in the NIH Office of AIDS Research.

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**Details of Full-Time Equivalent Employment (FTEs)**

OFFICE/DIVISION	FY 2008 Actual	FY 2009 Estimate	FY 2010 PB
Office of the Director	12	11	11
Office of Scientific Review	11	11	12
Office of Administrative Management	23	22	22
Division of Extramural Activities	35	34	35
Division of Genetic and Developmental Biology	10	10	11
Division of Pharmacology, Physiology and Biological Chemistry	22	22	22
Division of Cell Biology and Biophysics	12	12	12
Center of Bioinformatics and Computational Biology	5	5	5
Division of Minority Opportunities in Research	7	7	7
<b>Total</b>	<b>137</b>	<b>134</b>	<b>137</b>
Includes FTEs which are reimbursed from the NIH Roadmap for Medical Research			
FTEs supported by funds from Cooperative Research and Development Agreements	(0)	(0)	(0)
FISCAL YEAR	Average GM/GS Grade		
2006	12.3		
2007	12.5		
2008	12.6		
2009	12.6		
2010	12.6		



**NATIONAL INSTITUTES OF HEALTH  
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**Detail of Positions**

GRADE	FY 2008 Actual	FY 2009 Estimate	FY 2010 PB
Total, ES Positions	0	0	0
Total, ES Salary	0	0	0
GM/GS-15	12	12	12
GM/GS-14	28	28	29
GM/GS-13	22	21	21
GS-12	11	10	10
GS-11	12	12	12
GS-10	0	0	0
GS-9	3	3	4
GS-8	4	4	4
GS-7	2	2	2
GS-6	0	0	0
GS-5	0	0	0
GS-4	1	1	1
GS-3	0	0	0
GS-2	0	0	0
GS-1	0	0	0
Subtotal	95	93	95
Grades established by Act of July 1, 1944 (42 U.S.C. 207):	0	0	0
Assistant Surgeon General	0	0	0
Director Grade	0	0	0
Senior Grade	0	0	0
Full Grade	0	0	0
Senior Assistant Grade	0	0	0
Assistant Grade	0	0	0
Subtotal	0	0	0
Ungraded	54	54	56
Total permanent positions	95	93	95
Total positions, end of year	149	147	149
Total full-time equivalent (FTE) employment, end of year	137	134	137
Average ES salary	0	0	0
Average GM/GS grade	12.6	12.6	12.6
Average GM/GS salary	99,411	104,093	106,903

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

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**New Positions Requested**

	FY 2010		
	Grade	Number	Annual Salary
Health Scientist Administrator	GS-14	2	\$112,529
Grants Management Specialist	GS-9	1	55,221
<b>Total Requested</b>		<b>3</b>	