

DEPARTMENT OF HEALTH AND HUMAN SERVICES

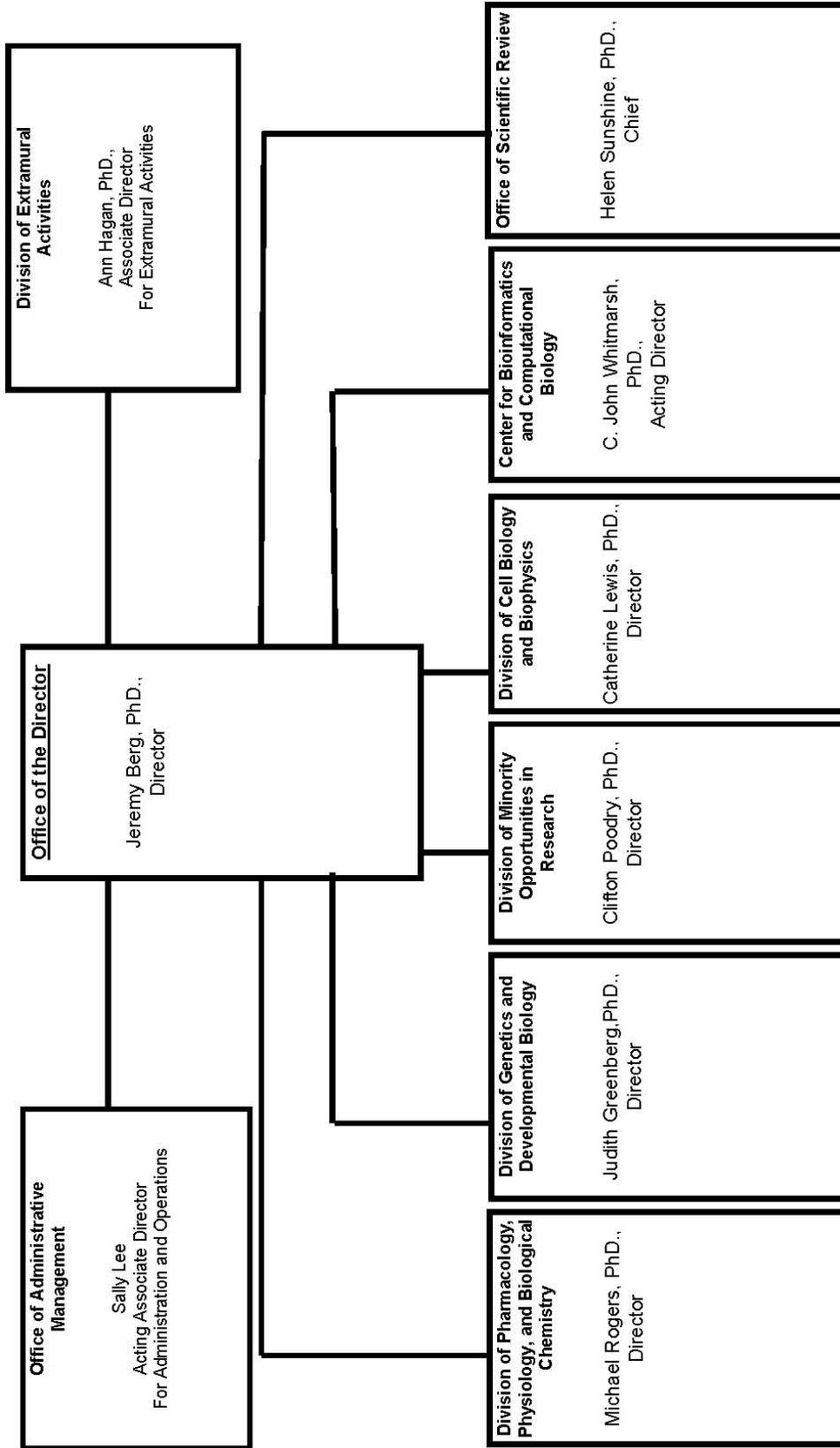
NATIONAL INSTITUTES OF HEALTH

National Institute of General Medical Sciences

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

**Organization Structure**



**FY 2008 Proposed Appropriation Language**

**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 \$1,941,462,000*

**Supplementary Exhibit**

**Comparison of Proposed FY 2008 Appropriation Language to  
Most Recently Enacted Full-Year Appropriations**

**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 [~~\$1,955,170,000~~] **\$1,941,462,000** (Department of Health and Human Services Appropriation Act, 2006)

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

**Amounts Available for Obligation 1/**

Source of Funding	FY 2006 Actual	FY 2007 Continuing Resolution	FY 2008 Estimate
Appropriation	\$1,955,170,000	\$1,935,618,000	\$1,941,462,000
Enacted Rescissions	-19,552,000	0	0
Subtotal, Adjusted Appropriation	1,935,618,000	1,935,618,000	1,941,462,000
Real Transfer under Roadmap Authority	-17,297,000		
Real Transfer under Secretary's One-percent transfer authority	-1,330,000		
Comparative transfer from OD for NIH Roadmap	17,297,000		
Comparative Transfer to NIBIB	-13,000	-13,000	
Comparative transfer to OD	-6,000	-6,000	
Comparative Transfer to NCRR	-225,000	-163,000	
Comparative Transfers to the Office of the Assistant Secretary for Admin. And Mgmt. and to the Office of the Assistant Secretary for Public Affairs	-1,000	-1,000	
Subtotal, adjusted budget authority	1,934,043,000	1,935,435,000	1,941,462,000
Unobligated Balance, start of year	0	0	0
Unobligated Balance, end of year	0	0	0
Subtotal, adjusted budget authority	1,934,043,000	1,935,435,000	1,941,462,000
Unobligated balance lapsing	-65,000	0	0
Total obligations	1,933,978,000	1,935,435,000	1,941,462,000

1/ Excludes the following amounts for reimbursable activities carried out by this account:  
FY 2006 - \$1,880,000    FY 2007 - \$1,224,000    FY 2008 - \$1,231,000

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

(Dollars in Thousands)

Budget Mechanism - Total

MECHANISM	FY 2006 Actual		FY 2007 Continuing Resolution		FY 2008 Estimate		Change	
	No.	Amount	No.	Amount	No.	Amount	No.	Amount
Research Grants:								
<u>Research Projects:</u>								
Noncompeting	2,941	\$1,008,784	2,811	\$949,868	2,895	\$973,105	84	\$23,237
Administrative supplements	(257)	15,248	(245)	15,248	(245)	15,248	0	0
Competing	944	296,508	1,070	336,047	1,022	321,086	-48	-14,961
Subtotal, RPGs	3,885	1,320,540	3,881	1,301,163	3,917	1,309,439	36	8,276
SBIR/STTR	169	45,370	165	44,235	163	43,668	-2	-567
Subtotal, RPGs	4,054	1,365,910	4,046	1,345,398	4,080	1,353,107	34	7,709
<u>Research Centers:</u>								
Specialized/comprehensive	57	158,381	56	167,844	54	165,800	-2	-2,044
Clinical research	0	0	0	0	0	0	0	0
Biotechnology	0	2,320	0	2,047	0	2,047	0	0
Comparative medicine	0	418	0	422	0	422	0	0
Research Centers in Minority Institutions	0	0	0	0	0	0	0	0
Subtotal, Centers	57	161,119	56	170,313	54	168,269	-2	-2,044
<u>Other Research:</u>								
Research careers	56	12,584	64	13,662	79	15,012	15	1,350
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	145	100,981	141	100,476	150	99,271	9	-1,205
Other	119	19,184	126	19,088	126	19,088	0	0
Subtotal, Other Research	320	132,749	331	133,226	355	133,371	24	145
<b>Total Research Grants</b>	<b>4,431</b>	<b>1,659,778</b>	<b>4,433</b>	<b>1,648,937</b>	<b>4,489</b>	<b>1,654,747</b>	<b>56</b>	<b>5,810</b>
<u>Research Training:</u>	<u>FTEs</u>		<u>FTEs</u>		<u>FTEs</u>			
Individual awards	586	24,554	607	25,905	600	25,594	-7	-311
Institutional awards	3,811	160,505	3,885	161,451	3,838	159,514	-47	-1,937
Total, Training	4,397	185,059	4,492	187,356	4,438	185,108	-54	-2,248
Research & development contracts (SBIR/STTR)	27 (0)	22,170 (102)	29 (0)	25,287 (102)	27 (0)	24,984 (102)	-2 0	-303 (0)
Intramural research	<u>FTEs</u> 9	2,507	<u>FTEs</u> 9	2,494	<u>FTEs</u> 9	2,477	<u>FTEs</u> 0	-17
Research management and support	110	47,232	115	48,142	118	48,623	3	481
Cancer prevention & control	0	0	0	0	0	0	0	0
Construction		0		0		0		0
Buildings and Facilities		0		0		0		0
NIH Roadmap for Medical Research	6	17,297	2	23,219	2	25,523		2,304
<b>Total, NIGMS</b>	<b>125</b>	<b>1,934,043</b>	<b>126</b>	<b>1,935,435</b>	<b>129</b>	<b>1,941,462</b>	<b>3</b>	<b>6,027</b>

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

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

	FY 2004 Actual		FY 2005 Actual		FY 2006 Actual		FY 2006 Comparable		FY 2007 Continuing Resolution		FY 2008 Estimate		Change	
	FTEs	Amount	FTEs	Amount	FTEs	Amount	FTEs	Amount	FTEs	Amount	FTEs	Amount	FTEs	Amount
<b>Extramural Research</b>														
<u>Detail:</u>														
Cell Biology and Biophysics		\$548,648		\$560,861		\$555,982		\$555,982		\$552,653		\$555,126		\$2,473
Genetics and Developmental Biology		498,511		513,462		497,905		497,905		494,924		497,138		2,214
Pharmacology, Physiology and Biological Chemistry		437,289		434,661		421,931		421,706		419,181		421,057		1,876
Bioinformatics and Computational Biology		62,887		66,927		81,256		81,256		80,769		81,131		362
Minority Opportunities in Research		123,302		126,973		125,099		125,099		126,697		125,279		-1,418
Training		185,827		185,816		185,059		185,059		187,556		185,108		-2,248
<b>Subtotal, Extramural</b>		1,856,464		1,888,700		1,867,232		1,867,007		1,861,580		1,864,839		3,259
<b>Intramural research</b>	18	2,719	13	2,522	9	2,507	9	2,507	9	2,494	9	2,477	0	-17
<b>Res. management &amp; support</b>	137	39,114	115	40,555	116	47,252	110	47,232	115	48,142	118	48,623	3	481
<b>NIH Roadmap for Medical Research</b>	-	16,911					6	17,297	2	23,219	2	25,523	0	2,304
<b>TOTAL</b>	155	1,915,208	128	1,931,777	125	1,916,991	125	1,934,043	126	1,935,435	129	1,941,462	3	6,027

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

## **Major Changes in the Fiscal Year 2008 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 2008 budget request for NIGMS, which is \$6.027 million more than the FY 2007 Continuing Resolution, for a total of \$1,941.462 million.

Research Project Grants (+ \$8.276 million; total \$1,309.439 million): NIGMS will support a total of 3,917 Research Project Grant (RPG) awards in FY 2008. Noncompeting RPGs will increase by 84 awards and increase by \$23.237 million. Competing RPGs will decrease by 48 awards and decrease by \$14.961 million.

Research Careers (+\$1.4 million; total \$15.012 million): NIGMS will support the Pathway to Independence program, by funding an additional 15 awards in FY 2008. Total support for the Pathway program in FY 2008 is 27 awards and \$1.4 million.

Research Training (-\$2.2 million; total \$185.108 million): NIGMS will slightly reduce the support of FTTPs as well as achieve savings through the continued implementation of the new NIH tuition policy.

NIH Roadmap for Biomedical Research (+\$8.2 million; total \$25.523 million): NIGMS will continue its support of the NIH Roadmap, an incubator for new ideas and initiatives that will accelerate the pace of discovery, in FY 2008.

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

FY 2007 Continuing Resolution		\$1,935,435,000		
FY 2008 Estimated Budget Authority		1,941,462,000		
Net change		6,027,000		
CHANGES	FY 2007			
	Continuing Resolution		Change from Base	
	FTEs	Budget Authority	FTEs	Budget Authority
A. Built-in:				
1. Intramural research:				
a. Annualization of January 2007 pay increase				
		\$1,348,000		\$9,000
b. January 2008 pay increase				
		1,348,000		30,000
c. Two extra days of pay				
		1,348,000		10,000
d. Payment for centrally furnished services				
		155,000		2,000
e. Increased cost of laboratory supplies, materials, and other expenses				
		0		0
		991,000		24,000
Subtotal				75,000
2. Research Management and Support:				
a. Annualization of January 2007 pay increase				
		\$15,881,000		\$105,000
b. January 2008 pay increase				
		15,881,000		357,000
c. Two extra days of pay				
		15,881,000		122,000
d. Payment for centrally furnished services				
		12,007,000		120,000
e. Increased cost of laboratory supplies, materials, and other expenses				
		0		0
		20,274,000		487,000
Subtotal				1,191,000
Subtotal, Built-in				1,266,000

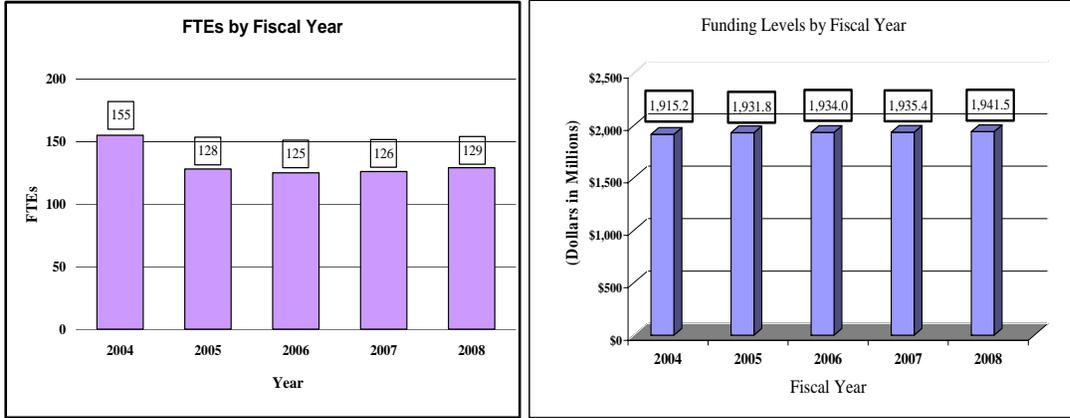
**NATIONAL INSTITUTES OF HEALTH**  
**National Institute of General Medical Sciences**

**Summary of Changes--continued**

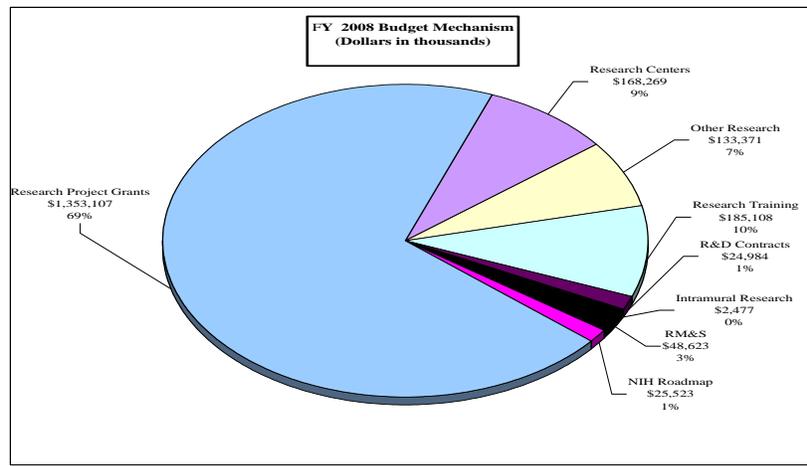
CHANGES	2007			
	Continuing Resolution		Change from Base	
	No.	Amount	No.	Amount
<b>B. Program:</b>				
1. Research project grants:				
a. Noncompeting	2,811	\$965,116,000	\$84	\$23,237,000
b. Competing	1,070	336,047,000	-48	-14,961,000
c. SBIR/STTR	165	44,235,000	-2	-567,000
Total	4,046	1,345,398,000	34	7,709,000
2. Research centers	56	170,313,000	-2	-2,044,000
3. Other research	331	133,226,000	24	145,000
4. Research training	4,492	187,356,000	-54	-2,248,000
5. Research and development contracts	29	25,287,000	-2	-303,000
Subtotal, extramural				3,259,000
6. Intramural research	<u>FTEs</u>		<u>FTEs</u>	
	9	2,494,000	0	-92,000
7. Research management and support	115	48,142,000	3	-710,000
8. Cancer control and prevention	0	0	0	0
9. Construction		0		0
10. Buildings and Facilities		0		0
11. NIH Roadmap for Medical Research	2	23,219,000	0	2,304,000
Subtotal, program		1,935,435,000		4,761,000
Total changes	126		3	6,027,000

## Fiscal Year 2007 Budget Graphs

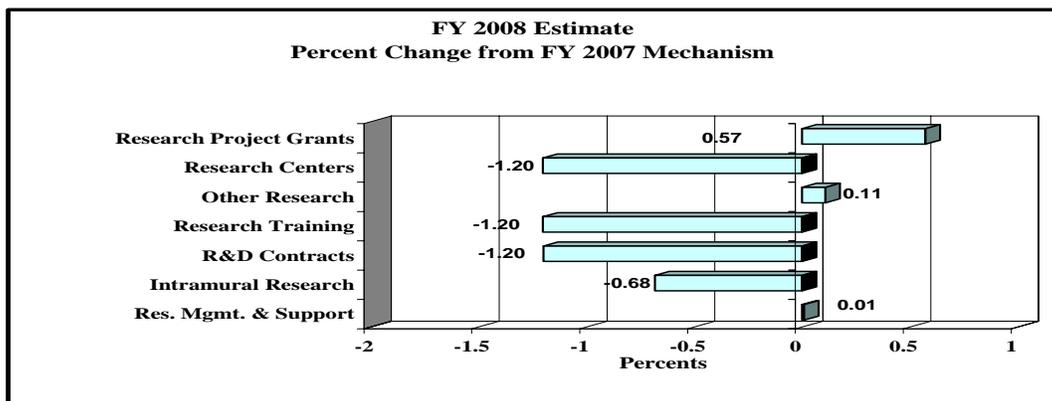
### History of Budget Authority and FTEs:



### 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 2006 Actual		FY 2007 Continuing Resolution		FY 2008 Estimate		Increase or Decrease	
<u>FTE</u>	<u>BA</u>	<u>FTE</u>	<u>BA</u>	<u>FTE</u>	<u>BA</u>	<u>FTE</u>	<u>BA</u>
125	\$1,934,043,000	126	\$1,935,435,000	129	\$1,941,462,000	3	\$6,027,000

This document provides justification for the Fiscal Year (FY) 2008 activities of the National Institute of General Medical Sciences (NIGMS), including HIV/AIDS activities. Details of the FY 2008 HIV/AIDS activities are in the “Office of AIDS Research (OAR)” Section of the Overview. Details on the Roadmap/Common Fund are located in the Overview, Volume One.

**DIRECTOR’S OVERVIEW**

NIGMS catalyzes and supports basic research and training in a broad range of fields, including cell biology, structural biology, genetics, chemistry, and pharmacology. Most of the institute’s research is investigator-initiated: Academic scientists propose research projects that are peer-reviewed and re compete for funding every 4 years. This approach has paid tremendous dividends in increasing our understanding of life processes and the origins of disease. One reflection of the significance of NIGMS research is the 62 Nobel Prizes awarded to institute grantees over the past 44 years. The tradition continued in 2006, with prizes going to three long-time grantees.

The fruits of fundamental research are inherently difficult to forecast. At times, the unexpected prevails, as in the case of the 2006 Nobel Prize in physiology or medicine. In the course of studies on the regulation of gene expression, Andrew Fire, Ph.D., and Craig Mello, Ph.D., discovered that double-stranded RNA—present as a trace contaminant in some of the samples—could silence genes. These studies used a model organism, the roundworm *C. elegans*, but other researchers supported by NIGMS soon demonstrated that gene silencing occurs in human cells, as well. The process has rapidly become an exceptionally powerful research tool and a potential new treatment approach for a wide variety of conditions. The most productive route to such truly transformative discoveries is to support a wide range of investigators working on fundamental processes and allow them the freedom to follow their scientific instincts when they make surprising observations.

But unanticipated discovery is not always the ticket. Dogged persistence is another key strategy for solving very tough biological problems, and to stay the course, investigators need unwavering support. The research of Roger Kornberg, Ph.D., who was recognized with the 2006 Nobel Prize in chemistry, is an example of such persistence. Kornberg studies transcription, the key step in gene expression in which information from DNA is copied into RNA by an enzyme called RNA polymerase. In the late 1970s, Kornberg embarked on a quest to determine the three-dimensional structure of RNA polymerase, despite the fact that it was many times larger and more complicated than any structure that had been solved at that point. Over the next two decades, with sustained NIGMS support, he and his coworkers learned how to handle the molecular giant and developed entirely novel methods that revealed its structure with increasing clarity. Kornberg finally solved the RNA polymerase structure in 2001, work that has revealed a great deal about how the molecule functions and informed the studies of thousands of other scientists.

Kornberg's triumph relied on technology developed through another NIGMS activity, the Protein Structure Initiative (PSI). Like diamonds, the molecular crystals crucial for studies of protein structure come in various qualities. Most contain flaws that limit the quality of the structure that can be determined. As part of its mission to make protein structure determination faster, easier, and cheaper, the PSI developed robotic systems for the rapid, automated testing of crystals. This allowed Kornberg to screen hundreds of crystals and pick the best for detailed study. As this example shows, there is great value in supporting both investigator-initiated studies and larger-scale, more directed programs such as the PSI. Striking a balance between these types of research is a key component of the NIGMS budget strategy.

NIGMS began supporting all three of these 2006 Nobel laureates early in their research careers. Such support for new investigators is a high priority for the institute. NIGMS policy favors making awards in response to well-reviewed applications from new investigators. Institute staff track the outcomes of this policy, particularly the relative success rates for new versus established investigators, and make adjustments as necessary.

While some individuals, such as Roger Kornberg, are fortunate to grow up in a biomedical research environment (his father, a long-time NIGMS grantee, had previously received a Nobel Prize), most future scientists need well-structured training programs to develop their potential as contributors to the biomedical research enterprise. NIGMS supports many important training programs, including the Medical Scientist Training Program (a combined M.D.-Ph.D. program) and 10 different Ph.D. training programs, among them a newly launched one at the interface of the behavioral and biomedical sciences. Additional training and related activities focus on increasing the diversity and strength of the biomedical research workforce. Supporting all of these programs remains a high priority for NIGMS as a way to help our nation maintain and enhance the most powerful and competitive scientific workforce in the world.

As an adjunct to its ongoing planning processes, NIGMS holds periodic meetings with scientists from around the country for broad discussions of scientific trends and areas of opportunity. The last such meeting, NIGMS Visions of the Future, was held in 2002 (see <http://www.nigms.nih.gov/News/Reports/visions.htm>). One outcome of these discussions was the development of a joint program in mathematical biology with the National Science

Foundation's Division of Mathematical Sciences. After a favorable analysis of the results of the first 4 years of this interdisciplinary and interagency program ([http://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=nsf06607](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf06607)), it has been reannounced for FY 2007. The institute will hold its next major "visions" meeting in the spring of 2007. The input from the scientific community at this meeting will be coupled with a detailed analysis of the components of existing NIGMS programs to guide adjustments in emphasis within the institute's research and training portfolios.

### **FY 2008 Justification by Activity Detail**

**Overall Budget Policy:** Investigator-initiated research projects and new investigator research are the institute's highest priorities. To maintain a balance of research support, NIGMS carefully evaluates investigator-initiated requests to submit grant applications for all large programs. The level of support provided for institute-initiated projects (*e.g.*, RFAs) in areas of science that need stimulation is also carefully evaluated. A scientific review of all research grant applications is conducted and the results are presented to the NIGMS Advisory Council for input prior to making funding decisions. 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.

**Cell Biology and Biophysics:** The mission of the Cell Biology and Biophysics (CBB) program is to foster the study of molecular and cellular structure and function. Significant physics- and chemistry-based technological advances have fueled progress in understanding life at the level of molecules and atoms. Fundamental structural biology research conducted with program support has yielded two Nobel Prizes in the past 5 years alone. This basic research is the basis for the development of precise, targeted therapies for a range of diseases.

**Budget Policy:** The FY 2008 budget estimate for the CBB program is \$555,126,000, an increase of \$2,473,000 and .4% over the FY 2007 estimate. The program plans for FY 2008 are as follows. Continued support of the Protein Structure Initiative (PSI), a 10-year project begun in 2000, is essential to achieve the program goal of transforming protein structure determination into a rapid and inexpensive enterprise that will be widely accessible to all scientists. Another major thrust within the CBB program is cellular imaging. NIGMS will continue to fund the most meritorious investigator-initiated research to yield new methods for viewing biological structures inside living cells. Funding this endeavor is crucial for understanding fundamental biological processes and identifying the earliest footprints of disease.

**Portrait of a Program: Speeding Translation of the Human Genome: The Protein Structure Initiative**

FY 2007 Level: \$69 million

FY 2008 Level: \$69 million

Change \$0

Now that researchers have decoded the genome—all of the genetic material—of humans and many other organisms, biomedical research is evolving very quickly. Translating the language of genomes into knowledge that can be applied to medical practice is one of the most exciting challenges facing the life sciences. Genes encode proteins, and those proteins each have unique, three-dimensional shapes that enable them to perform a wide range of tasks in the body. To understand protein function, researchers must go beyond gene sequences and examine the physical structure of proteins. NIGMS has been a long-time supporter of structural biology, which relies upon physical techniques that use X rays and massive magnets to itemize the locations of individual atoms in protein molecules. However, since these experiments are difficult and expensive, in 2000 NIGMS launched the Protein Structure Initiative (PSI) to catalyze progress in this area. A 10-year project to speed protein structure determination, the PSI is now midway through its course. After a 5-year pilot phase, the PSI now supports 10 centers that contribute nearly 40 percent of the new and unique protein structures deposited each year into a widely accessed public database, the Protein Data Bank. Other metrics of success include a three-fold decrease in cost per protein structure and a four-fold increase in process efficiency. The PSI program is now at a critical juncture, as NIGMS establishes mechanisms to share PSI resources with the entire scientific community. Thus far, the Institute has created a materials repository to collect and distribute scientific materials to researchers who need them and two centers dedicated to computer modeling techniques that are expected to significantly cut research time and cost by predicting protein structures from gene sequences alone. In FY 2007, NIGMS plans to launch a knowledge base that will provide centralized, one-stop access to PSI-generated information. FY 2008 funds will enable the PSI to markedly increase the number of unique protein structures solved and develop new methods for determining particularly challenging protein structures. Some of these structures may provide key information to guide the development of new drugs. It is expected that in the next few years, a substantial supply of experimental materials and information will have accumulated within the PSI materials repository and knowledge base. FY 2008 funds will be used to broadly distribute these resources to scientists. The ongoing efforts of the PSI are vital for extending powerful structural biology tools and information to researchers working on a broad range of diseases.

**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 understanding of common diseases and diverse behaviors.

**Budget Policy:** The FY 2008 budget estimate for the GDB program is \$497,138,000, an increase of \$2,214,000 and .4% over the FY 2007 estimate. The program plans for FY 2008 are as follows. The vast majority of expenditures within this program will continue to support individual investigators seeking fundamental knowledge about life processes. Past experience illuminates the success of allowing the most creative minds to steer scientific progress through discovery research. One frontier area that will likely show increased support through individual-investigator grants is systems-based approaches to discovering how the many genes that contribute to common diseases interact with each other and with external influences to bring about their effect. While studies of complex traits have been a long-standing GDB focus, significant amounts of new data, new scientific tools, and enhanced data sharing have offered a fresh way to investigate genetic components of disease in model organisms. This body of research will be an essential stepping stone to finding successful interventions for human diseases.

**Portrait of a Program: RNA Interference Transforms Biomedical Research**

FY 2007 Level: \$13.6 million

FY 2008 Level: \$13.6 million

Change \$0

The 2006 Nobel Prize in physiology or medicine went to Andrew Fire, Ph.D., and Craig Mello, Ph.D., long-time grantees of the NIGMS Division of Genetics and Developmental Biology, for their discovery of RNA interference (RNAi). Totally unexpected, the discovery has revolutionized biomedical research. Although it has been only 9 years since Fire and Mello published this fundamental finding, RNAi is in broad use as an experimental method for understanding how genes work. RNAi also shows tremendous promise to become a powerful therapeutic strategy for treating a wide array of human diseases. Already, clinical trials are under way to test an RNAi-based drug for macular degeneration, and plans are in the works to test other RNAi therapies for a childhood respiratory infection, pandemic flu, hepatitis, and other conditions. The discovery of RNAi illustrates the extraordinary value of investigator-initiated research. Further exploration of RNAi, including thousands of ongoing studies, is being pursued by scientists all over the world. Recognizing the potential of RNAi, NIGMS has played an active role in advancing the field by supporting scientific conferences, conducting periodic inventories of the extent of NIGMS and NIH support of RNAi research, and convening two workshops at which leading scientists identified obstacles and suggested ways in which NIH could facilitate progress. NIGMS staff also took the lead in creating an NIH RNAi Working Group to identify RNAi-related needs that would benefit from a trans-NIH attack and coordinated RNAi-based activities at NIH. The outcomes of these activities have included a call for new research directed toward solving the problem of delivering therapeutic RNA molecules to specific places in the body, which is currently a rate-limiting step in the wider application of RNAi as a successful medical strategy. These efforts also led to the creation of a database for RNAi probes, which are costly tools that scientists need to conduct RNAi experiments. Due to the transforming effects of RNAi technology on biomedical and behavioral research, in FY 2008 NIGMS expects to continue to fund a substantial number of investigator-initiated grants aiming to deepen understanding of how RNAi works at the molecular level. The institute may also participate in a trans-NIH initiative in FY 2008 to promote research to improve chemical features of RNA molecules and their bioavailability, or uptake into human tissues.

**Pharmacology, Physiology, and Biological Chemistry:** The mission of the Pharmacology, Physiology, and Biological Chemistry (PPBC) program is to support fundamental science that contributes to understanding human biology in health and disease, and that generates a knowledge base for the advancement of diagnostics and therapeutics. One recent example of the fruits of such research is Prezista™ (darunavir), which was recently approved for the treatment of drug-resistant AIDS. The program also funds research to explore clinical issues in important public health areas that either cut across or do not fall within the purview of other NIH components. These areas include whole-body responses to injury, burns, and anesthesia.

**Budget Policy:** The FY 2008 budget estimate for the PPBC program is \$421,057,000, an increase of \$1,876,000 and .4% over the FY 2007 estimate. The program plans for FY 2008 are as follows. PPBC will continue to emphasize the support of investigator-initiated research grants. One major activity that will receive continued support is the Pharmacogenetics Research Network, a trans-NIH effort launched in 2000. This network of researchers spanning 40 institutions is now having a measurable impact on the study of how genetic variations cause individuals to respond differently to medicines, a key aspect of Secretary Leavitt's 500-day plan. PPBC will also continue to fund three ongoing projects known as "glue grants" that have assembled large, trans-disciplinary research teams to tackle difficult problems in biomedicine: Inflammation and the Host Response to Injury, the Alliance for Cell Signaling, and the Consortium for Functional Glycomics.

**Portrait of a Program: Glycomics Consortium "Glue Grant" Bonds Research Community**

FY 2007 Level: \$7.8 million

FY 2008 Level: \$7.8 million

Change \$0 million

True scientific breakthroughs usually start with the creative spark of an individual, but the follow-through effort to translate findings to improving human health requires resources that go well beyond a single brain or a single laboratory. NIGMS has been a pioneer in finding innovative ways to fund team science, exemplified by the institute's "glue grant" program. One such grant, the Consortium for Functional Glycomics (CFG), was launched in October 2001 as a large-scale, collaborative effort to systematically map interactions between carbohydrates, or sugars, and proteins on cell surfaces. These encounters play a critical role in normal processes like pregnancy, embryonic development, and wound healing, but also in disease-related events such as viral attachment and cancer spread. Why are the body's sugars so important? Aside from our genes, another thing that distinguishes human beings from plants, rats, apes, and any other organism you can imagine is our glycome: the entire collection of sugar molecules in our bodies. While the scientific community has recognized the need for focused attention in this area, the daunting complexity of the human glycome has slowed the pace of progress. It is estimated that the glycome is thousands of times more complicated than the genome, and in fact is one of the most complex entities in all of nature. It is not surprising, then, that an organized effort to join forces has galvanized this field. In addition to promoting international collaboration, the team's work has produced useful research tools that are being widely used by the scientific community. One example is the "glycan array," a small glass slide, or "chip," that contains thousands of bits of sugars that can be tested for their ability to grip proteins. This array has found unexpected use in differentiating flu strains that infect people from strains that do not. In FY 2008, the CFG will continue to focus on developing resources and tools for the scientific community. The Functional Glycomics Gateway, a recently initiated partnership with the Nature Publishing Group, will help the CFG reach a greatly expanded audience of scientists to make them aware of the CFG and its resources. The CFG will continue to provide services to researchers working with the Centers for Disease Control and Prevention to screen samples of avian, or "bird," flu for the capacity to infect people. The CFG will also team with the National Cancer Institute in FY 2008 to provide services to researchers working as part of a glycomic biomarker effort for early diagnosis of cancer.

**Bioinformatics and Computational Biology:** The mission of the Bioinformatics and Computational Biology program is to support research in areas that join biology with computer science, engineering, mathematics, and physics. Major emphasis is placed on the development of computational tools, including methods for extracting knowledge from the voluminous data sets typically amassed by modern biomedical research laboratories.

Budget Policy: The FY 2008 budget estimate for the Bioinformatics and Computational Biology program is \$81,131,000, an increase of \$362,000 and .4% over the FY 2007 estimate. The program plans for FY 2008 are as follows. Highest priority will be given to investigator-initiated research. As in the past, NIGMS expects that investigator-initiated research will continue to yield innovative tools for exploring complex biological systems. In particular, the Models of Infectious Disease Agent Study (MIDAS) will continue to model the spread of infectious diseases. Information gained through MIDAS extends beyond the biomedical research community and also reaches policymakers and public health workers. A second major initiative in the center grants budget is the Centers for Systems Biology. A key aim of this effort is to nurture a new generation of researchers doubly fluent in the quantitative and life sciences.

**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, the program aims to strengthen the pipeline of minority researchers.

Budget Policy: The FY 2008 budget estimate for the MORE program is \$125,279,000, a decrease of \$1,418,000 and -1.1% from the FY 2007 estimate. The program plans for FY 2008 are as follows. In FY 2006, a working group of the National Advisory General Medical Sciences Council advised the institute to rebalance its MORE portfolio to place greater emphasis on student development and training. In response, NIGMS program staff have begun to reorganize existing programs to comply with this recommendation. NIGMS also plans to partner with the National Academies to examine the current state of research on interventions that influence the participation of underrepresented minorities in biomedical and behavioral science. Future changes to MORE programs will reflect the outcome of these activities.

**Research Training:** The mission of the Research Training program is to train the next generation of biomedical and behavioral scientists. The program provides broad-based, multidisciplinary research training for over 4,000 Ph.D. and M.D. students nationwide. In addition, more than 500 young researchers receive NIGMS postdoctoral support for advanced and specialized training in basic, translational, and clinical research. The institute also supports the training of clinician-scientists through postdoctoral training grants and provides funds to universities with a significant minority student population through the Minority Access to Research Careers program.

Budget Policy: The FY 2008 budget estimate for the Research Training program is \$185,108,000, a decrease of \$2,248,000 and -1.2% from the FY 2007 estimate. The program plans for FY 2008 are as follows. Maintaining a healthy pipeline of researchers is the linchpin 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. The number of trainees supported on the ongoing training programs will be scaled back to accommodate the addition of a new program that will support the research training of basic behavioral scientists.

**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.

Budget Policy: The FY 2008 budget estimate for the Intramural Research program is \$2,477,000, a decrease of \$17,000 and -.7% from the FY 2007 estimate. The program plans for FY 2008 are as follows. NIGMS will continue to fund PRAT fellows to conduct research in intramural laboratories of other NIH institutes and centers or in Food and Drug Administration laboratories. Though this program is small, NIGMS will work to identify areas of potential savings that will allow us to continue the successful promotion of translational science. Many PRAT fellows go on to further their careers in universities, industry, or government agencies, contributing expertise to the design of new, more effective, and safer drugs.

**Research Management and Support:** NIGMS 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. The institute currently oversees more than 4,400 research grants, 900 training grants and 20 research and support contracts.

Budget Policy: The FY 2008 budget estimate for RMS is \$48,623,000, an increase of \$481,000 and 1% over the FY 2007 estimate. The program plans for FY 2008 are as follows. The institute regularly solicits the advice of the scientific community to help assign priorities and set its research agenda for future years. Strategic planning efforts that employ RMS funds include periodic meetings with the biomedical and behavioral research community. These meetings, the next of which is scheduled for FY 2007, help identify emerging trends and ascertain needs. Information will be shared widely in FY 2008 to help develop principles to guide NIGMS research support in years to come. RMS funds have been used for the development and implementation of a new NIGMS information technology architecture that utilizes and integrates NIH-wide information technology systems. This has provided NIGMS staff with an integrated electronic work environment and has largely reduced the routine use of paper files in institute grants management functions.

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**Budget Authority by Object**

	FY 2007 Continuing Resolution	FY 2008 Estimate	Increase or Decrease
Total compensable workyears:			
Full-time employment	126	129	3
Full-time equivalent of overtime & holiday hours	1	1	0
Average ES salary	\$147,149	\$151,453	\$4,304
Average GM/GS grade	12.3	12.3	0.0
Average GM/GS salary	\$95,800	\$98,602	\$2,802
Average salary, grade established by act of July 1, 1944 (42 U.S.C. 207)	\$0	\$0	\$0
Average salary of ungraded positions	134,049	137,970	3,921
<b>OBJECT CLASSES</b>	<b>FY 2007 Continuing Resolution</b>	<b>FY 2008 Estimate</b>	<b>Increase or Decrease</b>
Personnel Compensation:			
11.1 Full-Time Permanent	\$7,476,000	\$7,972,000	\$496,000
11.3 Other than Full-Time Permanent	5,645,000	6,020,000	375,000
11.5 Other Personnel Compensation	460,000	491,000	31,000
11.7 Military Personnel	0	0	0
11.8 Special Personnel Services Payments	314,000	335,000	21,000
<b>Total, Personnel Compensation</b>	<b>13,895,000</b>	<b>14,818,000</b>	<b>923,000</b>
12.0 Personnel Benefits	3,334,000	3,555,000	221,000
12.2 Military Personnel Benefits	0	0	0
13.0 Benefits for Former Personnel	0	0	0
<b>Subtotal, Pay Costs</b>	<b>17,229,000</b>	<b>18,373,000</b>	<b>1,144,000</b>
21.0 Travel & Transportation of Persons	359,000	363,000	4,000
22.0 Transportation of Things	81,000	82,000	1,000
23.1 Rental Payments to GSA	0	0	0
23.2 Rental Payments to Others	0	0	0
23.3 Communications, Utilities & Miscellaneous Charges	180,000	183,000	3,000
24.0 Printing & Reproduction	718,000	727,000	9,000
25.1 Consulting Services	369,000	373,000	4,000
25.2 Other Services	6,636,000	6,718,000	82,000
25.3 Purchase of Goods & Services from Government Accounts	88,531,000	89,078,000	547,000
25.4 Operation & Maintenance of Facilities	13,000	13,000	0
25.5 Research & Development Contracts	1,321,000	1,321,000	0
25.6 Medical Care	0	0	0
25.7 Operation & Maintenance of Equipment	160,000	162,000	2,000
25.8 Subsistence & Support of Persons	0	0	0
<b>25.0 Subtotal, Other Contractual Services</b>	<b>97,030,000</b>	<b>97,665,000</b>	<b>635,000</b>
26.0 Supplies & Materials	292,000	296,000	4,000
31.0 Equipment	528,000	535,000	7,000
32.0 Land and Structures	0	0	0
33.0 Investments & Loans	0	0	0
41.0 Grants, Subsidies & Contributions	1,795,799,000	1,797,715,000	1,916,000
42.0 Insurance Claims & Indemnities	0	0	0
43.0 Interest & Dividends	0	0	0
44.0 Refunds	0	0	0
<b>Subtotal, Non-Pay Costs</b>	<b>1,894,987,000</b>	<b>1,897,566,000</b>	<b>2,579,000</b>
<b>NIH Roadmap for Medical Research</b>	<b>23,219,000</b>	<b>25,523,000</b>	<b>2,304,000</b>
<b>Total Budget Authority by Object</b>	<b>1,935,435,000</b>	<b>1,941,462,000</b>	<b>6,027,000</b>

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

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**Salaries and Expenses**

OBJECT CLASSES	FY 2007 Continuing Resolution	FY 2008 Estimate	Increase or Decrease
<b>Personnel Compensation:</b>			
Full-Time Permanent (11.1)	\$7,476,000	\$7,972,000	\$496,000
Other Than Full-Time Permanent (11.3)	5,645,000	6,020,000	375,000
Other Personnel Compensation (11.5)	460,000	491,000	31,000
Military Personnel (11.7)	0	0	0
Special Personnel Services Payments (11.8)	314,000	335,000	21,000
<b>Total Personnel Compensation (11.9)</b>	<b>13,895,000</b>	<b>14,818,000</b>	<b>923,000</b>
Civilian Personnel Benefits (12.1)	3,334,000	3,555,000	221,000
Military Personnel Benefits (12.2)	0	0	0
Benefits to Former Personnel (13.0)	0	0	0
<b>Subtotal, Pay Costs</b>	<b>17,229,000</b>	<b>18,373,000</b>	<b>1,144,000</b>
Travel (21.0)	359,000	363,000	4,000
Transportation of Things (22.0)	81,000	82,000	1,000
Rental Payments to Others (23.2)	0	0	0
Communications, Utilities and Miscellaneous Charges (23.3)	180,000	183,000	3,000
Printing and Reproduction (24.0)	718,000	727,000	9,000
<b>Other Contractual Services:</b>			
Advisory and Assistance Services (25.1)	316,000	320,000	4,000
Other Services (25.2)	6,636,000	6,718,000	82,000
Purchases from Govt. Accounts (25.3)	30,651,000	29,859,000	-792,000
Operation & Maintenance of Facilities (25.4)	13,000	13,000	0
Operation & Maintenance of Equipment (25.7)	160,000	162,000	2,000
Subsistence & Support of Persons (25.8)	0	0	0
<b>Subtotal Other Contractual Services</b>	<b>37,776,000</b>	<b>37,072,000</b>	<b>-704,000</b>
Supplies and Materials (26.0)	292,000	296,000	4,000
<b>Subtotal, Non-Pay Costs</b>	<b>39,406,000</b>	<b>38,723,000</b>	<b>-683,000</b>
<b>Total, Administrative Costs</b>	<b>56,635,000</b>	<b>57,096,000</b>	<b>461,000</b>

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**Authorizing Legislation**

	PHS Act/ Other Citation	U.S. Code Citation	2007 Amount Authorized	FY 2007 Continuing Resolution	2008 Amount Authorized	FY 2008 Budget Estimate
Research and Investigation	Section 301	42§241	Indefinite		Indefinite	
Medical Sciences	Section 402(a)	P.L.-109-482		\$1,935,435,000	Indefinite	\$1,941,462,000
<b>Total, Budget Authority</b>						<b>1,941,462,000</b>

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**Appropriations History**

Fiscal Year	Budget Estimate to Congress	House Allowance	Senate Allowance	Appropriation <u>1/</u>
1999	1,111,439,000 <u>2/ 3/</u>	1,150,840,000	1,197,825,000	1,197,825,000
Rescission				(799,000)
2000	1,194,068,000 <u>2/</u>	1,298,551,000	1,352,843,000	1,361,668,000
Rescission				(7,248,000)
2001	1,389,492,000 <u>2/</u>	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 <u>4/</u>
2008	1,941,462,000			

1/ Reflects enacted supplementals, rescissions, and reappropriations.

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

3/ Reflects a decrease of \$3,447,000 for the budget amendment for Bioterrorism

4/ Annualized current rate

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

OFFICE/DIVISION	FY 2006 Actual	FY 2007 Continuing Resolution	FY 2008 Estimate
Office of the Director	13	13	13
Office of Scientific Review	8	9	10
Office of Administrative Management	21	21	21
Division of Extramural Activities	33	34	34
Division of Genetic and Developmental Biology	8	9	9
Division of Pharmacology, Physiology, and Biological Chemistry	19	19	19
Division of Cell Biology and Biophysics	10	11	12
Center of Bioinformatics and Computational Biology	2	3	4
Division of Minority Opportunities in Research	5	5	5
NIH Roadmap for Medical Research	6	2	2
<b>Total</b>	<b>125</b>	<b>126</b>	<b>129</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		
2004	12.3		
2005	12.2		
2006	12.3		
2007	12.3		
2008	12.3		

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**Detail of Positions**

GRADE	FY 2006 Actual	FY 2007 Continuing Resolution	FY 2008 Estimate
Total, ES Positions	0	1	1
Total, ES Salary	0	147,149	151,453
GM/GS-15	12	11	11
GM/GS-14	19	20	22
GM/GS-13	23	23	24
GS-12	12	12	12
GS-11	7	7	7
GS-10	0	0	0
GS-9	5	5	5
GS-8	4	4	4
GS-7	4	4	4
GS-6	0	0	0
GS-5	1	1	1
GS-4	0	0	0
GS-3	1	1	1
GS-2	0	0	0
GS-1	0	0	0
Subtotal	88	88	91
Grades established by Act of July 1, 1944 (42 U.S.C. 207):			
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	52	52	52
Total permanent positions	91	91	93
Total positions, end of year	140	140	142
Total full-time equivalent (FTE) employment, end of year	125	126	129
Average ES salary	0	147,149	151,453
Average GM/GS grade	12.3	12.3	12.3
Average GM/GS salary	93,139	95,800	98,602

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

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**New Positions Requested**

	FY 2008		
	Grade	Number	Annual Salary
Health Science Administrator	GS-14	2	\$106,331
Health Science Administrator	GS-13	1	\$89,985
<b>Total Requested</b>		<b>3</b>	