

DEPARTMENT OF HEALTH AND HUMAN SERVICES

NATIONAL INSTITUTES OF HEALTH

National Institute of Neurological Disorders and Stroke (NINDS)

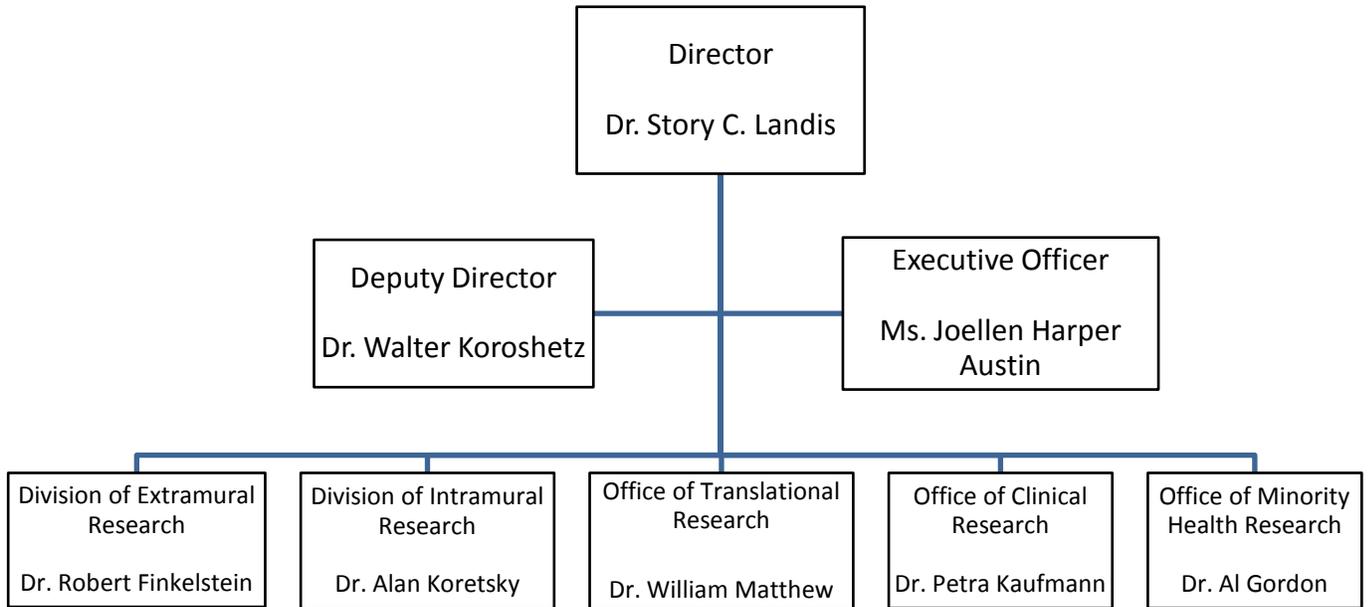
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NATIONAL INSTITUTES OF HEALTH

National Institute of Neurological Disorders and Stroke

Organizational Chart



NATIONAL INSTITUTES OF HEALTH

National Institute of Neurological Disorders and Stroke

For carrying out section 301 and title IV of the Public Health Services Act with respect to neurological disorders and stroke, [\$1,635,721,000] *\$1,681,333,000* (Department of Health and Human Services Appropriation Act, 2011)

**National Institutes of Health
National Institute of Neurological Disorders and Stroke**

Amounts Available for Obligation 1/

Source of Funding	FY 2009 Actual	FY 2010 Estimate	FY 2011 PB
Appropriation	\$1,593,344,000	\$1,636,371,000	\$1,681,333,000
Type 1 Diabetes	0	0	0
Rescission	0	0	0
Supplemental	0	0	0
Subtotal, adjusted appropriation	1,593,344,000	1,636,371,000	1,681,333,000
Real transfer under Director's one-percent transfer authority (GEI)	-2,577,000	0	0
Real transfer to the Global Fund to fight HIV/AIDS, Malaria and Tuberculosis	0	0	0
Comparative transfer to/from (specify)	-493,000	-650,000	0
Comparative transfer under Director's one-percent transfer authority (GEI)	2,577,000	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	1,592,851,000	1,635,721,000	1,681,333,000
Unobligated balance, start of year	0	0	0
Unobligated balance, end of year	0	0	0
Subtotal, adjusted budget authority	1,592,851,000	1,635,721,000	1,681,333,000
Unobligated balance lapsing	-6,000	0	0
Total obligations	1,592,845,000	1,635,721,000	1,681,333,000

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

FY 2009 - \$9,855,000 FY 2010 - \$9,063,000 FY 2011 - \$9,335,000

Excludes \$185,166 in FY 2009 and \$451,751 in FY 2010 for royalties.

NATIONAL INSTITUTES OF HEALTH
National Institute of Neurological Disorders and Stroke
(Dollars in Thousands)
Budget Mechanism - Total

MECHANISM	FY 2009 Actual		FY 2009 ARRA Actual		FY 2010 ARRA Estimate		FY 2010 Estimate		FY 2011 PB		Change	
	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount
Research Grants:												
Research Projects:												
Noncompeting	1,857	\$779,576	0	\$ -	337	\$141,836	1,853	\$791,306	1,929	\$834,311	76	\$43,005
Administrative supplements	(266)	16,890	(313)	47,118	(10)	1,103	(236)	15,000	(157)	10,000	(79)	(5,000)
Competing	641	260,441	369	155,055	28	8,705	691	286,389	691	291,986	0	5,597
Subtotal, RPGs	2,498	1,056,907	369	202,173	365	151,644	2,544	1,092,695	2,620	1,136,297	76	43,602
SBIR/STTR	97	39,098	2	1,168	6	9,979	97	39,777	94	39,588	(3)	-189
Subtotal, RPGs	2,595	1,096,005	371	203,341	371	161,623	2,641	1,132,472	2,714	1,175,885	73	43,413
Research Centers:												
Specialized/comprehensive	78	93,679	19	18,275	19	12,867	79	95,084	82	97,937	3	2,853
Clinical research	0	0	0	0	0	0	0	0	0	0	0	0
Biotechnology	0	0	0	0	0	0	0	0	0	0	0	0
Comparative medicine	0	0	0	0	0	0	0	0	0	0	0	0
Research Centers in Minority Institutions	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal, Centers	78	93,679	19	18,275	19	12,867	79	95,084	82	97,937	3	2,853
Other Research:												
Research careers	278	44,413	0	953	0	0	280	45,079	284	46,431	4	1,352
Cancer education	0	0	0	0	0	0	0	0	0	0	0	0
Cooperative clinical research	61	9,119	0	0	0	0	69	9,256	73	9,534	4	278
Biomedical research support	0	0	0	0	0	0	0	0	0	0	0	0
Minority biomedical research support	1	245	0	0	0	0	1	245	1	245	0	0
Other	75	12,756	0	436	0	0	76	12,947	78	13,335	2	388
Subtotal, Other Research	415	66,533	0	1,389	0	0	426	67,527	436	69,545	10	2,018
Total Research Grants	3,088	1,256,217	390	223,005	390	174,490	3,146	1,295,083	3,232	1,343,367	86	48,284
Research Training:												
Individual awards	425	15,853	0	0	0	0	425	16,012	425	17,069	0	1,057
Institutional awards	368	16,811	0	0	0	0	368	16,979	368	17,896	0	917
Total, Training	793	32,664	0	0	0	0	793	32,991	793	34,965	0	1,974
Research & development contracts (SBIR/STTR)	101	94,761	0	0	0	0	102	98,142	102	85,776	0	-12,366
	(1)	(65)	(0)	(0)	(0)	(0)	(2)	(428)	(2)	(428)	(0)	(0)
Intramural research												
	333	153,717	0	419	0	1,581	329	153,042	346	157,939	17	4,897
Research management and support												
	162	55,492	0	854	0	2,563	163	56,463	168	59,286	5	2,823
Total, NINDS	495	1,592,851	390	224,278	390	178,634	492	1,635,721	514	1,681,333	22	45,612

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

NATIONAL INSTITUTES OF HEALTH
National Institute of Neurological Disorders and Stroke
 BA by Program
 (Dollars in thousands)

	FY 2007		FY 2008		FY 2009		FY 2009		FY 2010		FY 2011		Change	
	FTEs	Amount	FTEs	Amount										
Extramural Research														
Detail:														
Channels, Synapses, & Circuits		\$193,083		\$186,310		\$174,374		\$174,634		\$180,008		\$184,790		4,782
Neural Environment		330,855		372,228		268,694		269,096		277,376		284,745		7,369
Neurodegeneration		192,755		194,628		188,284		188,565		194,367		199,531		5,164
Neurogenetics		211,039		196,263		191,319		191,605		197,501		202,748		5,247
Repair & Plasticity		154,237		151,261		148,834		149,057		153,643		157,725		4,082
Systems & Cognitive Neuroscience		191,996		185,544		179,505		179,773		185,304		190,228		4,924
Technology Development, Infrastructure & Resources		64,555		65,073		230,568		230,912		238,017		244,341		6,324
Subtotal, Extramural		1,338,520		1,351,307		1,381,578		1,383,642		1,426,216		1,464,108		37,892
Intramural research	364	142,234	347	144,982	333	153,713	333	153,717	329	153,042	346	157,939	17	4,897
Res. management & support	153	52,234	157	53,297	162	55,490	162	55,492	163	56,463	188	59,286	5	2,823
TOTAL	517	1,532,988	504	1,549,556	495	1,590,781	495	1,592,851	492	1,635,721	514	1,681,333	22	45,612

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

Major Changes in the Fiscal Year 2011 President's Budget

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 2011 President's Budget for NINDS, which is \$45.612 million more than the FY 2010 Estimate, for a total of \$1,681.333 million.

Research Project Grants (+\$43.602 million, total \$1,136.297 million)

NINDS will support a total of 2,620 Research Project Grant (RPG) awards in FY 2011. Noncompeting RPGs will increase by 76 awards and increase by \$43.005 million. Competing RPGs will remain at the same number of awards and increase by \$5.597 million. The NIH Budget policy for RPGs in FY 2011 includes a 2.0% inflationary increase in noncompeting awards and for the average costs in competing grants.

Research Careers (+\$1.352 million, total \$46.431 million)

NINDS will continue to support the Pathway to Independence Program by funding an additional 14 awards in FY 2011. Funds will become available as career awards convert to the noncompeting RPG mechanism.

Research & Development Contracts (+\$-12.366 million, total \$85.776 million)

NINDS will fund a new Medicinal Chemistry for Neurotherapeutics contract. The need for medicinal chemistry in the NIH community has grown in recent years as non-drug compounds with therapeutic potential have been identified in many disease areas.

NATIONAL INSTITUTES OF HEALTH
National Institute of Neurological Disorders and Stroke
Summary of Changes

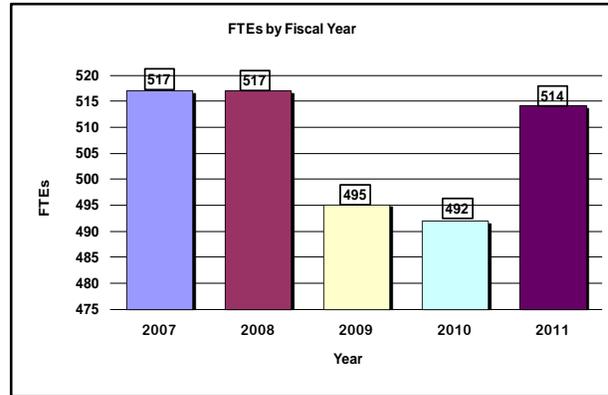
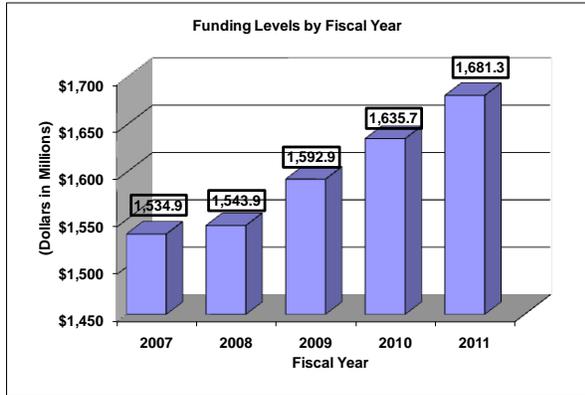
FY 2010 estimate		\$1,635,721,000	
FY 2011 estimated budget authority		1,681,333,000	
Net change		45,612,000	
CHANGES	2010 Current Estimate Base		Change from Base
	FTEs	Budget Authority	FTEs Budget Authority
A. Built-in:			
1. Intramural research:			
a. Annualization of January 2010 pay increase		\$51,593,000	\$312,000
b. January FY 2011 pay increase		51,593,000	542,000
c. Payment for centrally furnished services		24,813,000	496,000
d. Increased cost of laboratory supplies, materials, and other expenses		76,636,000	1,321,000
Subtotal		2,671,000	
2. Research management and support:			
a. Annualization of January 2010 pay increase		\$23,259,000	\$141,000
b. January FY 2011 pay increase		23,259,000	244,000
c. Payment for centrally furnished services		12,355,000	247,000
d. Increased cost of laboratory supplies, materials, and other expenses		20,849,000	347,000
Subtotal		979,000	
Subtotal, Built-in		3,650,000	

NATIONAL INSTITUTES OF HEALTH
National Institute of Neurological Disorders and Stroke

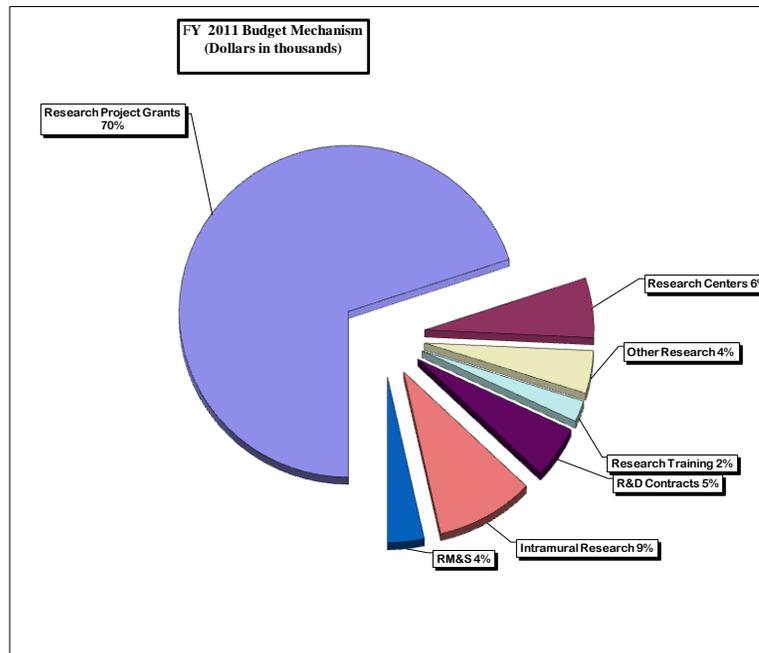
Summary of Changes--continued

CHANGES	2010 Current Estimate Base		Change from Base	
	No.	Amount	No.	Amount
B. Program:				
1. Research project grants:				
a. Noncompeting	1,853	\$806,306,000	76	\$38,005,000
b. Competing	691	286,389,000	0	5,597,000
c. SBIR/STTR	97	39,777,000	(3)	(189,000)
Total	2,641	1,132,472,000	73	43,413,000
2. Research centers	79	95,084,000	3	2,853,000
3. Other research	426	67,527,000	10	2,018,000
4. Research training	793	32,991,000	0	1,974,000
5. Research and development contracts	102	98,142,000	0	(12,366,000)
Subtotal, extramural				37,892,000
6. Intramural research	329	153,042,000	17	2,226,000
7. Research management and support	163	56,463,000	5	1,844,000
Subtotal, program		1,635,721,000		41,962,000
Total changes	492		22	45,612,000

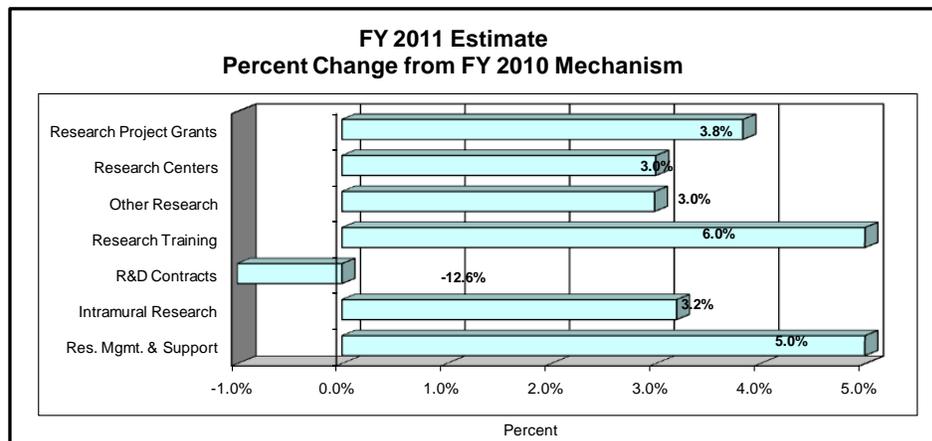
History of Budget Authority and FTEs:



Distribution by Mechanism:



Change by Selected Mechanisms:



Justification of President's Budget

National Institute of Neurological Disorders and Stroke

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

Budget Authority

	FY 2009 <u>Omnibus</u>	FY 2010 <u>Appropriation</u>	FY 2011 President's <u>Budget</u>	FY 2011+/- 2010 <u>Appropriation</u>
BA	\$1,593,344,000	\$1,635,721,000	\$1,681,333,000	+ \$45,612,000
FTE	488	492	514	+ 22

This document provides justification for the Fiscal Year (FY) 2011 activities of the National Institute of Neurological Disorders and Stroke (NINDS), including NIH/ AIDS activities. Details of the FY 2011 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.

NINDS Director's Overview

The mission of NINDS is to reduce the burden of neurological disorders through research. NINDS research reveals how the normal brain and nervous system develop, work, and what goes wrong in disease, and translates discoveries into better prevention and treatment.

Diseases of the nervous system afflict people of all ages throughout the world, inflict an enormous burden in lost life, disability, and suffering, and cost billions of dollars each year in medical expenses and reduced productivity. Despite progress, prevention and treatment are far from adequate for many of these diseases. Increased prevalence of neurological diseases as the U.S. population ages and enhanced recognition of the public health impact of others, including autism, traumatic brain injury, and chronic pain, heighten the urgency of the NINDS mission.

In February 2009, four NINDS strategic planning panels reported to the National Advisory Disorders and Stroke Council about how the Institute can more effectively carry out its mission. The four advisory panels focused, respectively, on basic, translational, and clinical research and on the spectrum of neurological disorders. Panel members included neurologists and neurosurgeons who treat children and adults, scientists from academia and industry, and representatives of disease advocacy organizations. Their findings reflected unprecedented access to data about the Institute's programs. NINDS is already implementing panel recommendations. In 2010 the NINDS planning process continues with a focus on diversity in the scientific workforce, as well as on health disparities, and a working group on global health issues.

Because of the rapid pace of science, all panels emphasized how NINDS should manage its projects, rather than what specific research areas the Institute should fund. NINDS must promote basic, translational, and clinical research according to their distinct needs, but must monitor success and act accordingly for all programs. Following this guidance, NINDS in 2010 shifted funds from two major resource programs and synchronized receipt dates for other programs to enable head-to-head competitive review. In June 2009, an expert panel on NINDS SBIR and STTR programs provided specific guidance for revising them. As the NINDS goes forward, the Institute will monitor all programs, using metrics that are appropriate to the science at hand.

Translating basic science into treatments that are ready for testing in people has long been an NINDS goal. Over more than 30 years, the Anticonvulsant Screening Program has contributed to the development of drugs that are now on the market, and the Neural Prosthesis Program has pioneered devices that help thousands of people. Since 2003, the Cooperative Program in Translational Research, with tailored review criteria and milestone-based funding, has fostered preclinical therapy development. In 2009, as suggested by the strategic planning Advisory Panel for Translational Research, NINDS established an Office of Translational Research (OTR) and recruited an Associate Director for Translational Research with extensive industry drug development experience. In 2011, OTR will lead a Grand Challenge on New Drugs for Diseases and Disorders of the Nervous System, in collaboration with 15 other NIH Institutes and Centers that work together through the NIH Blueprint for Neuroscience. This new initiative will support the development of drugs that will, if successful, transform the treatment of neurological, psychiatric or other nervous system diseases.

In 2009, NINDS also established an Office of Clinical Research (OCR) and recruited an Associate Director for Clinical Research. The OCR will continue efforts, already underway, to streamline the clinical trials applications process, ensure that NINDS clinical trials efficiently recruit and retain patients, evaluate the potential public health impact of proposed trials, and develop common data elements that will enable comparison and sharing of clinical data. In October 2009, NINDS convened experts from NIH, other agencies, academia, and the private sector to discuss how NINDS might appropriately advance its public health mission in implementation and comparative effectiveness research. All of these OCR activities respond to the strategic planning Advisory Panels on Clinical Research and Disease Research.

The Advisory Panel on Disease Research confronted the challenge of how NINDS should set priorities across the hundreds of diseases, common and rare, that affect the nervous system. In keeping with recommendations, NINDS is co-sponsoring with the NIH Office of Rare Diseases Research 9 of 18 new Rare Diseases Clinical Research Network disease consortia, announced October 2009, and administering the network's coordinating center. Nervous system disorders also include very common diseases, among them stroke, traumatic brain and spinal cord injury, and chronic pain. For the epilepsies, which affect nearly 1% of the U.S. population and inflict an even greater burden globally, and for selected other disorders, NINDS will pilot a "disease landscape" process. As suggested by the panel, disease landscapes systematically consider the public health impact, unmet scientific opportunities, and ongoing research at the NIH and elsewhere. This analysis will guide NINDS initiatives for the epilepsies in 2011.

All planning panels endorsed a continuing reliance on investigator-initiated research. NINDS engages the insight and ingenuity of the scientific community to propose,

review, and carry out research. Innovation is robust in neuroscience, as evident by the success of neuroscientists in the NIH Pioneer Awards Program. NINDS embraces NIH-wide efforts to encourage innovative research, including leadership in implementing changes to the NIH peer review system and specific programs, such as the Eureka program. NINDS is also among NIH leaders in support for new investigators and in training. Notable programs include the NIH Pathway to Independence awards and an NINDS research training program to encourage residents in neurology, neurosurgery, and neuropathology to pursue research careers.

Among the scientific advances of the last few years, research on several inherited neurological disorders has moved from gene discovery, to understanding mechanisms and therapy development in animals, and into clinical testing of the first treatments in people. New methods have enabled researchers to derive stem cells from adult patients to study disease and accelerate drug development. Research is revealing genes that contribute to stroke, Parkinson's disease, autism, multiple sclerosis, and other common diseases. Deep brain stimulation, now proven effective for Parkinson's disease, is being applied to other disorders, and neural prosthetic devices that read commands directly from the brain are moving toward reality. Neurological disorders present formidable challenges, but prospects for the future are encouraging because of the rapidly advancing science, and NINDS is continually improving its effectiveness in fostering research that reduces the burden of these diseases.

Overall Budget Policy:

The FY 2011 President's Budget for NINDS is \$1,681.333 million, an increase of \$45.612 million or +2.8 percent over the FY 2010 enacted level. NINDS balances investigator-initiated research with targeted solicitations that address mission-critical scientific opportunities and public health needs. Across all scientific and disease areas, programs are tailored to the different requirements of basic, translational, and clinical research. The Institute continues to place a high priority on competing research project grants to sustain productive research teams, support new investigators, and encourage innovative research. In FY 2011, NINDS will support new investigators on R01 equivalent awards at success rates equivalent to those of established investigators submitting new R01 equivalent applications. NINDS evaluates the mission relevance of all institute initiatives and of all requests to submit applications for large investigator-initiated projects. The Institute reviews programs in consultation with members of the NINDS Advisory Council and other outside experts, and the results inform decisions concerning future program directions and funding. Funds are included in R&D contracts to support several trans-NIH initiatives, such as the Therapies for Rare and Neglected Diseases program (TRND), the Basic Behavioral and Social Sciences Opportunity Network (OppNet), and support for a new synchrotron at the Brookhaven National Laboratory, as well as increased support for other HHS agencies through the program evaluation set-aside.

FY2011 Justification by Activity Detail

Channels, Synapses, and Circuits:

Ion channels, synapses, and circuits of interacting nerve cells are fundamental components of the nervous system. Ion channels carry electrical currents in cells. Synapses are the connections by which cells influence the activity of other cells. Circuits formed by networks of interconnected nerve cells carry out the higher functions of the brain. NINDS supports research on how channels, synapses, and circuits operate in the healthy nervous system in the adult and developing brain and on neurological disorders in which they play a major role. The program encompasses basic, translational, and clinical research, all with the ultimate goal of advancing treatment and prevention. The epilepsies, which affect nearly one percent of the U.S. population, are a disorders in which channels, synapses, and brain circuits are a major focus. The Institute continues its longstanding research program that has contributed to many advances in epilepsy treatment. The Epilepsy Benchmarks Process brought the NIH, the research community, and non-governmental organizations together to establish goals for epilepsy research. In accord with those goals, NINDS is increasing emphasis on preventing the epilepsies and their progression, developing new therapeutic strategies and optimizing current therapies, and addressing co-morbidities of epilepsy.

Budget Policy: The 2011 President's Budget of \$184.790 million for Channels, Synapses, and Circuits represents an increase of \$4.782 million or 2.7 percent from the 2010 estimate. In 2011, NINDS will continue to balance investigator-initiated and solicited research, including projects funded through the Institute's translational research and clinical trials programs. For 2011, the Institute will undertake a coordinated series of initiatives in epilepsy that will focus on translational research, on innovative research, and on supporting coordinated research teams to focus on specific issues raised by the Epilepsy Benchmarks. The Benchmarks process brings the NIH, the research community, and non-governmental organizations together to establish goals for epilepsy research and monitor progress.

Neural Environment:

Non-neuronal cells, which far outnumber nerve cells in the brain, maintain the local environment around nerve cells, fight infections, and control which molecules get into the brain through the blood-brain barrier. Neurological disorders may result when non-neuronal cells are compromised, as in multiple sclerosis; when these cells themselves become aggressors, as in cancer; or when viruses, bacteria, or parasites infect the nervous system. Stroke, multiple sclerosis, brain tumors, neurofibromatosis, tuberous sclerosis, and infectious diseases, including NeuroAIDS are among the diseases in which non-neuronal cells play a central role. NINDS supports basic, translational, and clinical research on the neural environment, with the goal of improving prevention and treatment of many neurological disorders.

Budget Policy: The 2011 President's Budget of \$284.745 million for Neural Environment represents an increase of \$7.369 million or 2.7 percent from the 2010 estimate. NINDS will continue to rely on a balance of solicited and investigator-initiated research, including research through the Institute's translational research and clinical trials programs. Continuing programs on brain tumors, in collaboration with NCI,

include joint intramural research on brain tumors, solicitations for research on brain tumor dispersal, and translational research centers focused on the diagnosis, prevention, and treatment of brain tumors. Other NINDS solicitations continuing in 2011 focus on the mechanisms of functional recovery after stroke and on novel models of HIV in the nervous system. The Specialized Program of Translational Research in Acute Stroke (SPOTRIAS) centers program is also continuing.

Neurodegeneration:

For many neurodegenerative disorders, risk increases in older people. These diseases present an increasing challenge to the U.S. as our population ages. Alzheimer's disease, amyotrophic lateral sclerosis (ALS), frontotemporal dementias, Huntington's disease, and Parkinson's disease are among the neurodegenerative diseases that affect adults. NINDS basic, translational, and clinical research continues to make contributions to improving treatment and prevention of neurodegenerative disorders. One major insight from neurodegeneration research is the recognition that shared mechanisms contribute to multiple neurodegenerative diseases, and that similar therapeutic strategies may be effective for different disorders. Research on the commonalities among neurodegenerative disorders continues to be a major priority for NINDS research.

Budget Policy: The 2011 President's Budget for Neurodegeneration activities is \$199.531 million, an increase of \$5.164 million or 2.7% from the FY 2010 estimate. NINDS neurodegeneration research will continue to balance investigator-initiated research and solicited research, including projects funded through the Institute's translational research and clinical trials programs. The Morris K. Udall Parkinson's Disease Centers of Excellence program is continuing, and the Institute is revitalizing the Parkinson's Disease Data Organizing Center (PD-DOC), which will serve as a resource for clinical data for the Parkinson's disease research community. The Institute also continues to support genetic studies of Parkinson's disease and other neurodegenerative disorders through the NINDS Human Genetics Repository and other efforts. The Institute will also address a critical need for biomarkers to advance the development of new therapeutics for Parkinson's disease. Biomarkers will allow selection of the best candidate therapies for testing and shorten clinical trials from about 7 years to 3 years. Another new initiative will focus on identification and validation of novel targets for the development of drugs against Huntington's disease.

Neurogenetics:

Gene defects cause hundreds of diseases that affect the nervous system. Symptoms may be evident early in infancy or only emerge later, even in old age. Neurogenetic disorders include the ataxias, Down syndrome, dystonia, lysosomal storage diseases, muscular dystrophies, peripheral neuropathies, Rett syndrome, spinal muscular atrophy, and Tourette syndrome, among many others. Research has identified hundreds of single gene defects that are responsible for diseases, leading to better diagnostics, animal models for testing therapies, and rationally designed interventions that are now showing promise in animals and beginning to enter clinical testing. Identifying gene defects that cause disease and translating insights from those discoveries into therapies continues to be a major priority for NINDS. Defects in single genes usually cause uncommon disorders. Multiple genes interacting with environmental influences contribute to the susceptibility and progression of common neurological disorders,

including autism, stroke, Parkinson's disease, and multiple sclerosis. With improvements in technology, this has become another major area of research that NINDS supports through various mechanisms and resources, including the NINDS Human Genetics Repository. In addition to investigator-initiated research, catalyzing research by supporting common resources, and targeting solicitations to unmet research opportunities, NINDS supports many scientific workshops on neurogenetic disorders that stimulate the research community to discuss the state of the science and opportunities for progress.

Budget Policy: The 2011 President's Budget of \$202.748 million for Neurogenetics represents an increase of \$5.247 million or 2.7 percent from the 2010 estimate. NINDS will continue investigator initiated grants and targeted activities in neurogenetics, including projects funded through the Institute's translational research and clinical trials programs. The Institute is continuing its support for the Autism Centers for Excellence and for the Paul D. Wellstone Muscular Dystrophy Cooperative Research Centers, both of which are trans-NIH programs. Among other continuing activities are program announcements on generalized and focal dystonias, and on translational research for neuromuscular diseases (including muscular dystrophy, spinal muscular atrophy, and amyotrophic lateral sclerosis). NINDS will also support next generation gene sequencing studies on ALS (amyotrophic lateral sclerosis, or Lou Gehrig's disease), Parkinson's disease, and frontotemporal dementia.

Repair and Plasticity:

NINDS supports extensive research on spinal cord injury and traumatic brain injury (TBI), and on repairing damage to the nervous system from disease or trauma. This includes longstanding support for the study of neural stem cells and for research on the brain's innate capacity to adapt through "plasticity.". For more than thirty years, the NINDS Neural Prosthesis program has successfully pioneered research on devices that restore nervous system function lost to injury or disease. Current emphasis areas include a new generation of devices that take signals directly from the brain and technology for deep brain stimulation, which is demonstrated effective or shows promise for treating several neurological disorders. Stimulated by the high rate of traumatic brain injury among U.S. military personnel, NINDS has enhanced coordination of TBI research within NIH and across the several Federal Agencies that support such research, including the Departments of Defense and Veterans Affairs. Recent trans-agency collaborative workshops have focused on TBI classification, the unique issues of TBI from blast, TBI and psychological health, common data elements for TBI research, combination therapies for TBI, and gender, race, and socioeconomic factors in TBI. In December 2008, NINDS also led an NIH Roundtable on Opportunities to Advance Research on Neurological and Psychiatric Emergencies.

Budget Policy: The 2011 President's Budget of \$157.725 million for Repair and Plasticity represents an increase of \$4.082 million or 2.7 percent from the 2010 estimate. NINDS continues to balance investigator-initiated research and solicitations, including projects funded through the Institute's translational research and clinical trials programs. The Institute is continuing its support for the Facilities of Research Excellence in Spinal Cord Injury. Solicitations continuing in 2011 focus on advanced neural prosthetics research and development, on advanced tools and technologies for

cerebrospinal fluid shunts, on human pluripotent stem cell research using non-embryonic sources, and on angiogenesis in the nervous system in health and disease.

Systems and Cognitive Neuroscience:

Systems of interconnected nerve circuits in the brain, spinal cord, and body control learning, memory, attention, language, thinking, emotion, movement, the sleep-wake cycle, pain perception, feeding, and other complex behaviors. NINDS supports basic research on how systems of nerve cells carry out these functions and on counteracting the disruptive effects of neurological disorders on neural circuits. Stroke, brain trauma, and neurodegenerative diseases are among the disorders that affect cognition and other complex behaviors. Migraine and other chronic pain conditions, which are very prevalent disorders, are also an important area emphasis in this program. As the largest NIH supporter of research on pain, NINDS is a leader of the NIH Pain Consortium, which promotes collaboration among the NIH institutes and centers that address pain.

Budget Policy: The 2011 President's Budget of \$190.228 million for Systems and Cognitive Neuroscience represents an increase of \$4.924 million or 2.7 percent from the 2010 estimate. NINDS balances investigator initiated research and solicitations, including projects funded through the Institute's translational research and clinical trials programs. NINDS continues to work with the other members of the NIH Pain Consortium for Neuroscience on pain research initiatives on mechanisms, models, measurement, and management in pain research. The NIH Blueprint for Neuroscience has also selected "Understanding the Transition from Acute to Chronic Pain" as the focus of a Grand Challenge program, with the goal of building on the advances in understanding in nervous system plasticity generally. Among other activities in this program, a solicitation on the cognitive sequelae of Parkinson's disease is also continuing.

Technology Development, Infrastructure, and Resources:

NINDS programs foster preclinical therapeutics development, provide research resources, promote research on minority health and health disparities, and support clinical trials. In 2009, following the advice of the NINDS external Strategic Planning Advisory Panel on Translational Research, NINDS established an Office of Translational Research (OTR) and recruited a director who has extensive experience in therapy development in industry, as well as academia. The OTR now leads and coordinates NINDS translational research activities, which span many institute program areas. In 2009, NINDS also established an Office of Clinical Research and recruited a director with extensive clinical research and clinical trials experience. The Office of Clinical Research is continuing efforts that are already underway to streamline the clinical trials applications process, stage clinical trials funding to reflect patient recruitment and retention, and develop common data elements that will enable comparison and sharing of clinical data. These efforts are all responsive to advice from the NINDS external Strategic Planning Advisory Panel on Clinical Research. Also in response to strategic planning panel recommendations, NINDS has increased the rigor of its evaluation of resource programs, shifting funding away from programs that are no longer maximally effective.

Budget Policy: The 2011 President's Budget of \$244.341 million for Technology Development, Infrastructure, and Resources represents an increase of \$6.324 million or 2.7 percent from the 2010 estimate. The NINDS is leading a new NIH Blueprint for Neuroscience Grand Challenge to develop new drugs for the nervous system. As a major component of that program, the NINDS will develop a medicinal chemistry resource to support drug development. The continuing Cooperative Program in Translational Research provides milestone-gated funding for investigator-initiated projects from academic and small business laboratories to develop therapies for any disease within the NINDS mission. Among other efforts continuing in 2011, is a solicitation to support optimization of small molecule probes for the nervous system and the SMA (spinal muscular atrophy) Project, which is continuing to advance drug candidates through preclinical development and planning for the transition to human clinical testing. The Anticonvulsant Screening Program and, research cores are among the other technology, infrastructure, and resource programs continuing in 2011. Among the clinical trials activities, the program has issued a revised solicitation to serve as a vehicle for submission of investigator-initiated exploratory clinical trials (Phase I and II studies) of drugs, biologics or devices, as well as surgical, behavioral or rehabilitation therapies. A solicitation to encourage and facilitate ancillary studies undertaken in conjunction with on-going NINDS-funded clinical trials of neurological disorders is also continuing in 2011.

Portrait of a Program: Medicinal Chemistry resources for drug development

FY 2010 Level: \$0.000 million

FY 2011 Level: \$7.400 million

Change: \$7.400 million

Responding to a convergence of scientific opportunity and public health need, NINDS is leading an NIH Blueprint Grand Challenge to develop new drugs for diseases that affect the nervous system. The Blueprint for Neuroscience is a framework for cooperative effort among 16 NIH Institutes and Centers that support neuroscience research. In 2011, as a central aspect of this program, NINDS will provide an industry-quality medicinal chemistry resource that will, at least initially, be dedicated to supporting this program. Medicinal chemists systematically modify compounds that have some desirable activity in laboratory tests, transforming them into safe and potent drugs that have all of the characteristics necessary for treating human patients. The Grand Challenge will fund investigator-initiated drug development projects and provide access to resources and expertise that are often not available to academic researchers. To qualify, proposed projects must first provide at least one small molecule that can serve as a starting point for drug development, robust laboratory tests to measure improvements to the starting compounds, and a feasible plan for clinical testing. The NIH Roadmap Molecular Libraries program and initiatives to develop small molecule probes for the nervous system are among several existing NIH programs that support research to meet these entry criteria. The effectiveness of properly-structured, contract medicinal chemistry services and the need for a project management team that includes drug development experts with industry experience are among the lessons applied from the NINDS spinal muscular atrophy (SMA) project, which is an NINDS pilot program to develop drugs for SMA.

The Grand Challenge program is designed to move drug candidates seamlessly to phase I clinical trials. Progress against specific milestones, including those for medicinal chemistry, will determine which projects continue and resources will shift to successful projects as others drop out. The overall program's success can be compared with industry programs in which about one in ten projects reach phase I clinical trials. However, the program focuses on opportunities that industry is unlikely to pursue, whether because a disease presents a small market or a treatment strategy is novel and presents too high a risk of failure. Indeed, as projects progress in the drug development pipeline, the diminishing risk may attract industry investment to pursue further development.

Portrait of a Program: Neurology Emergency Treatment Trials Network (NETT)

FY 2010 Level: \$10.000 million

FY 2011 Level: \$10.000 million

Change: \$0.000 million

Stroke, brain and spinal cord trauma, status epilepticus (continuous seizures), and other neurological emergencies constitute 5 to 10 percent of all medical emergencies and often cause long term disability. Although NINDS clinical trials have contributed to progress on pioneering treatments for stroke and for spinal cord injury, treatments are still far from adequate and clinical trials confront formidable obstacles. In 2007, NINDS began to develop the Neurology Emergency Clinical trials Network (NETT) to enable faster, better, and more efficient clinical trials of interventions to improve the care of neurological emergencies.

NETT brings together neurologists, neurosurgeons, emergency and critical care physicians, and other specialists through 17 regional "hubs," each connected to "spokes" at community hospitals, with more than 100 affiliated clinical sites nationwide. Centralized resources support data management, clinical coordination, and subject recruitment. By conducting multiple clinical trials through a streamlined management structure, NETT eliminates redundant costs and idle resources. Innovative approaches to data collection, regulatory compliance, trial design, and management are also yielding substantial economies and quality improvement.

Investigators within and outside NETT propose clinical studies, which are rigorously peer reviewed and supported through separate grants. NETT is already collaborating on 22 projects for 11 neurological conditions. These include two major phase III clinical trials: 1) evaluating albumin, a natural protein, to protect the brain following stroke, and 2) testing intramuscular injection of midazolam by paramedics for treatment of status epilepticus. Phase III trials will begin by spring 2010 to test the steroid progesterone for traumatic brain injury and the drug clopidogrel to prevent major strokes that often follow a transient ischemic attack, or mini-stroke. Several clinical trial proposals are under review for possible start in 2011. NINDS is closely monitoring achievement of milestones for the quality and timely completion of trials. Early results suggest that NETT can perform trials more quickly, for less cost, and with equal or greater quality than traditional single trial management schemes for neurological emergencies.

Intramural Research:

The NINDS Intramural Research Program conducts basic, translational, and clinical research on the NIH campus in Bethesda, Maryland, which is the largest community of neuroscientists in the world. Among the unique resources of the NIH campus, the Mark O. Hatfield Clinical Center is a hospital totally dedicated to clinical research and the NIH Porter Neuroscience Research Center integrates neuroscience across NIH institutes and disciplinary boundaries. Ongoing Intramural activities that respond to high institute priorities include a joint brain tumor program with the National Cancer Institute, the Suburban Hospital and Washington Hospital Center Stroke centers, pioneering research on neural stem cells, investigations of biomarkers to accelerate therapy development for multiple sclerosis, translating gene findings to therapies for neurogenetic diseases, and research on the consequences of head trauma in military personnel. The Intramural Research Program has also been a leader in development of novel magnetic resonance imaging (MRI) strategies for detecting normal and abnormal function of the brain.

Budget Policy: The 2011 President's Budget of \$157.939 million for the Intramural Research Program represents an increase of \$4.897 million or 3.2 percent from the

2010 estimate. The program continues to re-vitalize clinical research with the recruitment of investigators spanning clinical research to translational research. New research teams are focusing on neurosurgical approaches to treating brain tumors; neuroimmunology aimed at treating multiple sclerosis; mechanisms of virus infection and replication in the brain; and basic mechanisms responsible for hereditary spastic paraplegias. NINDS is also recruiting muscular dystrophy researchers.

Research Management and Support (RMS):

NINDS 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.

Budget Policy: The FY 2011 President's Budget of \$59.286 million represents an increase of \$2.823 million or 5 percent over the FY 2010 estimate.

Recovery Act Implementation

Recovery Act Funding: \$402.912 million

In FY 2009, NINDS received \$402.9 million under the Recovery Act. Of the amount, \$224.3 million was obligated in FY2009 and \$178.6 million will be obligated in FY2010. NINDS awarded 37 Challenge Grants in addition to those funded by NIH OD, and the Institute funded 21 Grand Opportunity grants, with 6 grants co-funded by NIH OD. Both of these trans-NIH programs support bold, potentially high impact research. Using 53% of the funds, NINDS supported particularly meritorious and mission-relevant applications that scored above the Institutes' extremely competitive payline. The Institute awarded 287 administrative supplements for research falling within the scope of ongoing projects and 26 competitive revisions (formerly called competitive supplements) for research outside that scope. NINDS funded 115 administrative supplements for Summer Research Experience, which provided much needed summer jobs for high school and college students. The NINDS awarded 18 P30 grants for recruitment of outstanding investigators into tenure track or tenured positions in basic, translational and clinical neuroscience, allowing the creation of 25 new faculty positions. The Institute also awarded 8 grants under the NIMH-led request for applications on autism.

The NINDS signature project "Genetics and Genomics of Neurological Disorders" focuses on identifying genes that cause disease or confer susceptibility. Investigators are using next-generation sequencing and other emerging technologies to identify gene variants associated with neurological disorders, whether in combination with other genes or environmental factors. Several other emerging scientific opportunities also received a significant boost. The institute, for example, funded several translational projects that move insights from basic research into preclinical therapy development, and awarded multiple projects on induced pluripotent stem cells (iPS cells). Like embryonic stem cells, iPS cells can both self-renew (multiply) and form specialized cell types, but scientists recently developed methods to produce iPS cells from a patient's skin cells, and then generate the cell types affected by disease to study cellular mechanisms of disease, screen drugs, and, perhaps, generate cells for therapeutic transplantation.

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Budget Authority by Object

	FY 2010 Enacted	FY 2011 PB	Increase or Decrease	Percent Change
Total compensable workyears:				
Full-time employment	492	514	22	4.5
Full-time equivalent of overtime and holiday hours	1	1	0	0.0
Average ES salary	\$164,151	\$166,449	\$2,298	1.4
Average GM/GS grade	11.8	11.8	0.0	0.0
Average GM/GS salary	\$93,098	\$94,401	\$1,303	1.4
Average salary, grade established by act of July 1, 1944 (42 U.S.C. 207)	\$99,975	\$101,375	\$1,400	1.4
Average salary of ungraded positions	122,527	124,242	1,715	1.4
OBJECT CLASSES	FY 2010 Estimate	FY 2011 Estimate	Increase or Decrease	Percent Change
Personnel Compensation:				
11.1 Full-time permanent	\$27,875,000	\$29,485,000	\$1,610,000	5.8
11.3 Other than full-time permanent	21,814,000	23,261,000	1,447,000	6.6
11.5 Other personnel compensation	1,837,000	1,943,000	106,000	5.8
11.7 Military personnel	878,000	936,000	58,000	6.6
11.8 Special personnel services payments	7,505,000	8,023,000	518,000	6.9
Total, Personnel Compensation	59,909,000	63,648,000	3,739,000	6.2
12.0 Personnel benefits	14,400,000	15,293,000	893,000	6.2
12.2 Military personnel benefits	543,000	579,000	36,000	6.6
13.0 Benefits for former personnel	0	0	0	0.0
Subtotal, Pay Costs	74,852,000	79,520,000	4,668,000	6.2
21.0 Travel and transportation of persons	3,161,000	3,242,000	81,000	2.6
22.0 Transportation of things	320,000	326,000	6,000	1.9
23.1 Rental payments to GSA	0	0	0	0.0
23.2 Rental payments to others	73,000	78,000	5,000	6.8
23.3 Communications, utilities and miscellaneous charges	835,000	859,000	24,000	2.9
24.0 Printing and reproduction	301,000	325,000	24,000	8.0
25.1 Consulting services	1,143,000	1,165,000	22,000	1.9
25.2 Other services	13,279,000	13,135,000	(144,000)	-1.1
25.3 Purchase of goods and services from government accounts	135,862,000	141,402,000	5,540,000	4.1
25.4 Operation and maintenance of facilities	3,559,000	3,587,000	28,000	0.8
25.5 Research and development contracts	45,502,000	29,896,000	(15,606,000)	-34.3
25.6 Medical care	1,294,000	1,303,000	9,000	0.7
25.7 Operation and maintenance of equipment	10,662,000	11,230,000	568,000	5.3
25.8 Subsistence and support of persons	0	0	0	0.0
25.0 Subtotal, Other Contractual Services	211,301,000	201,718,000	(9,583,000)	-4.5
26.0 Supplies and materials	7,495,000	7,562,000	67,000	0.9
31.0 Equipment	12,946,000	13,081,000	135,000	1.0
32.0 Land and structures	0	0	0	0.0
33.0 Investments and loans	0	0	0	0.0
41.0 Grants, subsidies and contributions	1,324,435,000	1,374,620,000	50,185,000	3.8
42.0 Insurance claims and indemnities	0	0	0	0.0
43.0 Interest and dividends	2,000	2,000	0	0.0
44.0 Refunds	0	0	0	0.0
Subtotal, Non-Pay Costs	1,560,869,000	1,601,813,000	40,944,000	2.6
Total Budget Authority by Object	1,635,721,000	1,681,333,000	45,612,000	2.8

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

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Salaries and Expenses

OBJECT CLASSES	FY 2010 Enacted	FY 2011 PB	Increase or Decrease	Percent Change
Personnel Compensation:				
Full-time permanent (11.1)	\$27,875,000	\$29,485,000	\$1,610,000	5.8
Other than full-time permanent (11.3)	21,814,000	23,261,000	1,447,000	6.6
Other personnel compensation (11.5)	1,837,000	1,943,000	106,000	5.8
Military personnel (11.7)	878,000	936,000	58,000	6.6
Special personnel services payments (11.8)	7,505,000	8,023,000	518,000	6.9
Total Personnel Compensation (11.9)	59,909,000	63,648,000	3,739,000	6.2
Civilian personnel benefits (12.1)	14,400,000	15,293,000	893,000	6.2
Military personnel benefits (12.2)	543,000	579,000	36,000	6.6
Benefits to former personnel (13.0)	0	0	0	0.0
Subtotal, Pay Costs	74,852,000	79,520,000	4,668,000	6.2
Travel (21.0)	3,161,000	3,242,000	81,000	2.6
Transportation of things (22.0)	320,000	326,000	6,000	1.9
Rental payments to others (23.2)	73,000	78,000	5,000	6.8
Communications, utilities and miscellaneous charges (23.3)	835,000	859,000	24,000	2.9
Printing and reproduction (24.0)	301,000	325,000	24,000	8.0
Other Contractual Services:				
Advisory and assistance services (25.1)	1,143,000	1,165,000	22,000	1.9
Other services (25.2)	13,279,000	13,135,000	(144,000)	-1.1
Purchases from government accounts (25.3)	86,578,000	88,361,000	1,783,000	2.1
Operation and maintenance of facilities (25.4)	3,559,000	3,587,000	28,000	0.8
Operation and maintenance of equipment (25.7)	10,662,000	11,230,000	568,000	5.3
Subsistence and support of persons (25.8)	0	0	0	0.0
Subtotal Other Contractual Services	115,221,000	117,478,000	2,257,000	2.0
Supplies and materials (26.0)	7,468,000	7,535,000	67,000	0.9
Subtotal, Non-Pay Costs	127,379,000	129,843,000	2,464,000	1.9
Total, Administrative Costs	202,231,000	209,363,000	7,132,000	3.5

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Authorizing Legislation						
	PHS Act/ Other Citation	U.S. Code Citation	2010 Amount Authorized	FY 2010 Estimate	2011 Amount Authorized	FY 2011 PB
Research and Investigation	Section 301	42§241	Indefinite	\$1,635,721,000	Indefinite	\$1,681,333,000
National Institute of Neurological Disorders and Stroke	Section 402(a)	42§281	Indefinite		Indefinite	
Total, Budget Authority				1,635,721,000		1,681,333,000

NATIONAL INSTITUTES OF HEALTH
National Institute of Neurological Disorders and Stroke

Appropriations History

Fiscal Year	Budget Estimate to Congress	House Allowance	Senate Allowance	Appropriation
2002	1,316,448,000	1,306,321,000	1,352,055,000	1,328,188,000
Rescission				(1,522,000)
2003	1,432,305,000	1,432,305,000	1,466,005,000	1,466,005,000
Rescission				(9,529,000)
2004	1,468,926,000	1,468,326,000	1,510,926,000	1,510,776,000
Rescission				(9,569,000)
2005	1,545,623,000	1,545,623,000	1,569,100,000	1,539,448,000
Rescission				(12,675,000)
2006	1,550,260,000	1,550,260,000	1,591,924,000	1,550,260,000
Rescission				(1,503,000)
2007	1,524,750,000	1,524,750,000	1,537,703,000	1,534,757,000
2008	1,537,019,000	1,559,106,000	1,573,268,000	1,571,353,000
Rescission				(27,452,000)
Supplemental				8,212,000
2009	1,545,397,000	1,598,521,000	1,588,405,000	1,593,344,000
2010	1,612,745,000	1,650,253,000	1,620,494,000	1,636,371,000
Rescission				0
2011	1,681,333,000			

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 2009 Actual	FY 2010 Enacted	FY 2011 PB
Office of the Director	59	59	60
Division of Extramural Research	82	82	82
Division of Intramural Research	333	329	346
Office of Translational Research	7	7	9
Office of Clinical Research	10	10	12
Office of Minority Health Research	4	5	5
Total	495	492	514
Includes FTEs which are reimbursed from the NIH Roadmap for Medical Research			
FTEs supported by funds from Cooperative Research and Development Agreements	(2)	(2)	(2)
FISCAL YEAR	Average GM/GS Grade		
2007	13.2		
2008	11.8		
2009	11.8		
2010	11.8		
2011	11.8		

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Detail of Positions

GRADE	FY 2009 Actual	FY 2010 Enacted	FY 2011 PB
Total, ES Positions	1	1	1
Total, ES Salary	160,272	164,151	166,449
GM/GS-15	30	30	30
GM/GS-14	42	42	43
GM/GS-13	76	74	80
GS-12	53	52	57
GS-11	46	46	48
GS-10	6	6	6
GS-9	37	37	45
GS-8	18	18	18
GS-7	5	5	5
GS-6	1	1	1
GS-5	0	0	0
GS-4	3	3	3
GS-3	2	2	2
GS-2	0	0	0
GS-1	1	1	1
Subtotal	320	317	339
Grades established by Act of July 1, 1944 (42 U.S.C. 207):			
Assistant Surgeon General	0	0	0
Director Grade	5	5	5
Senior Grade	1	1	1
Full Grade	0	0	0
Senior Assistant Grade	1	1	1
Assistant Grade	0	0	0
Subtotal	7	7	7
Ungraded	193	193	193
Total permanent positions	324	321	343
Total positions, end of year	524	521	543
Total full-time equivalent (FTE) employment, end of year	495	492	514
Average ES salary	160,272	164,151	166,449
Average GM/GS grade	11.8	11.8	11.8
Average GM/GS salary	90,898	93,098	94,401

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

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New Positions Requested

	FY 2011		
	Grade	Number	Annual Salary
Health Science Administrator	GS-14/15	5	126,533
Staff Scientist	GS-12	3	85,842
Research Fellow	GS-9	6	55,070
Scientific Writer	GS-12	1	74,872
Program Analyst	GS-9	5	62,544
Grants Management Specialist	GS-9	2	66,630
Total Requested		22	\$471,491