DEPARTMENT OF HEALTH AND HUMAN SERVICES

NATIONAL INSTITUTES OF HEALTH

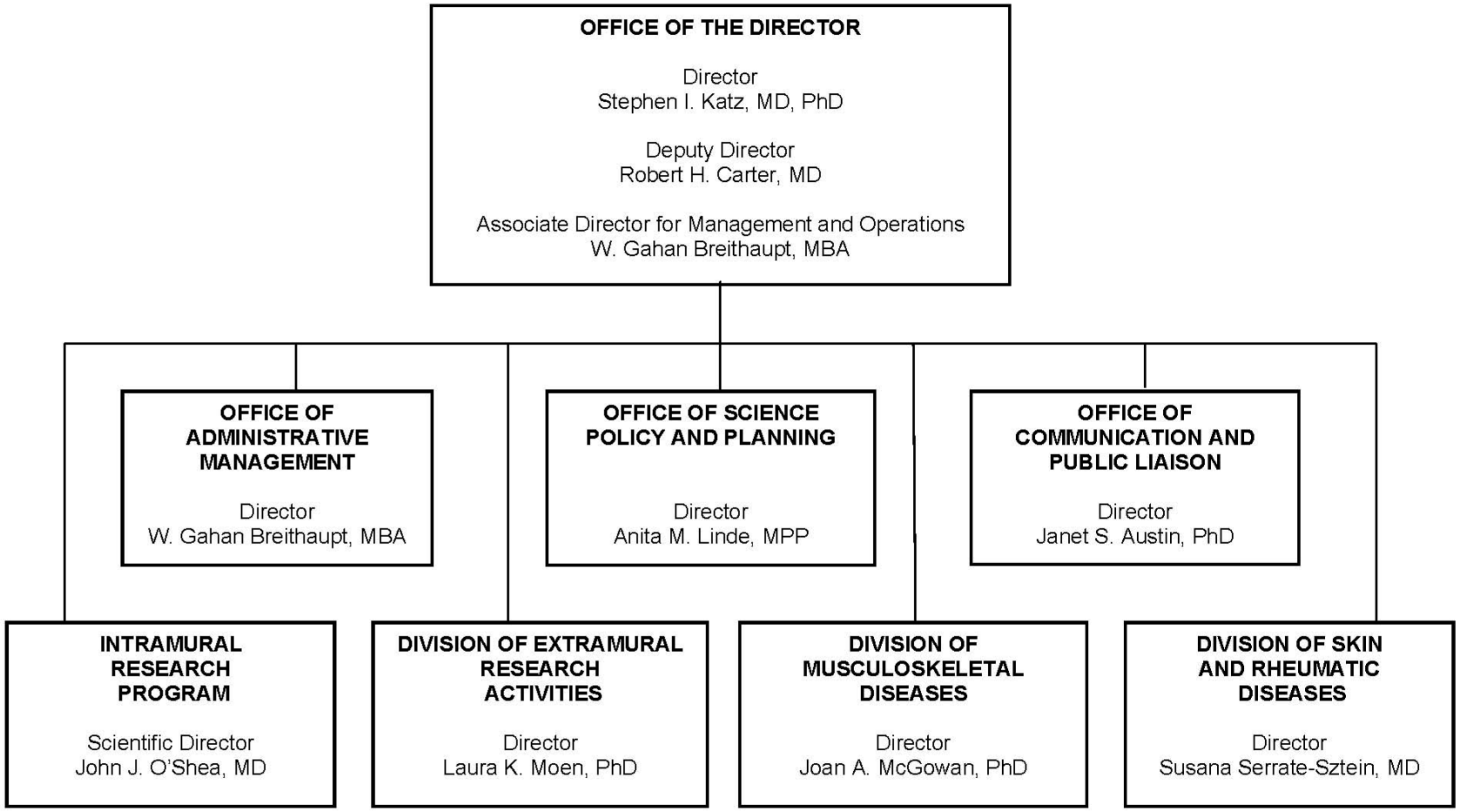
National Institute of Arthritis and Musculoskeletal and Skin Diseases

FY 2011 Budget — Page No.

NATIONAL INSTITUTES OF HEALTH

National Institute of Arthritis and Musculoskeletal and Skin Diseases

Organizational Structure



NATIONAL INSTITUTES OF HEALTH

National Institute of Arthritis and Musculoskeletal and Skin Diseases

For carrying out section 301 and title IV of the Public Health Services Act with respect to arthritis and musculoskeletal and skin diseases [$539,082,000] *$555,715,000* (Public Law 111-117, Consolidated Appropriations Act, 2010, *)*

National Institutes of Health
National Institute of Arthritis and Musculoskeletal and Skin Diseases

Amounts Available for Obligation 1/

Source of Funding	FY 2009 Actual	FY 2010 Enacted	FY 2011 PB
Appropriation	$524,872,000	$539,082,000	$555,715,000
Type 1 Diabetes	0	0	0
Rescission	0	0	0
Supplemental	0	0	0
Subtotal, adjusted appropriation	524,872,000	539,082,000	555,715,000
Real transfer under Director's one-percent transfer authority (GEI)	-866,000	0	0
Real transfer to the Global Fund to fight HIV/AIDS, Malaria and Tuberculosis	0	0	0
Comparative transfer to the National Center for Biotechnology Information	-83000	-128,000	0
Comparative transfer to the National Library of Medicine for Public Access	-93000	-100,000	0
Comparative transfer under Director's one-percent transfer authority (GEI)	866,000	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	524,696,000	538,854,000	555,715,000
Unobligated balance, start of year	0	0	0
Unobligated balance, end of year	0	0	0
Subtotal, adjusted budget authority	524,696,000	538,854,000	555,715,000
Unobligated balance lapsing	-119,000	0	0
Total obligations	524,577,000	538,854,000	555,715,000

1/ Excludes the following amounts for reimbursable activities carried out by this account:
FY 2009 - $1,207,000 FY 2010 - $1,200,000 FY 2011 - $1,238,000

NATIONAL INSTITUTES OF HEALTH

National Institute of Arthritis and Musculoskeletal and Skin Diseases

(Dollars in Thousands)

Budget Mechanism - Total

MECHANISM	FY 2009 Actual		FY 2009 Recovery Act Actual		FY 2010 Recovery Act Estimated		FY 2010 Enacted		FY 2011 PB		Change	
Research Grants:	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount
Research Projects:												
Noncompeting	756	$250,439	$0	$0	$88	$38,155	703	$247,768	754	$268,601	51	$20,833
Administrative supplements	(20)	2,547	(54)	7,735	(4)	5,723	(28)	1,800	(28)	1,854	0	54
Competing:												
Renewal	67	29,175	13	4,686	0	0	79	34,230	66	29,344	(13)	-4,886
New	160	47,850	78	35,912	7	3,424	182	56,153	153	48,137	(29)	-8,016
Supplements	11	1,855	32	16,849	1	640	13	2,176	11	1,865	(2)	-311
Subtotal, competing	238	78,880	123	57,448	8	4,065	274	92,559	230	79,346	(44)	(13,213)
Subtotal, RPGs	994	331,866	123	65,183	96	47,943	977	342,127	984	349,801	7	7,674
SBIR/STTR	36	12,380	12	2,830	6	2,402	36	12,623	37	13,114	1	491
Subtotal, RPGs	1,030	344,246	135	68,013	102	50,345	1,013	354,750	1,021	362,915	8	8,165
Research Centers:												
Specialized/comprehensive	40	41,102	7	4,834	8	4,462	40	41,718	40	42,970	0	1,252
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	30	0	0	0	0	0	30	0	0	0	-30
Research Centers in Minority Institutions	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal, Centers	40	41,132	11	4,834	8	4,462	40	41,748	40	42,970	0	1,222
Other Research:												
Research careers	152	18,510	0	1,158	0	0	152	18,790	153	19,354	1	564
Cancer education	0	0	0	0	0	0	0	0	0	0	0	0
Cooperative clinical research	0	0	0	0	0	0	0	0	0	0	0	0
Biomedical research support	0	0	0	0	0	0	0	0	0	0	0	0
Minority biomedical research support	0	0	0	0	0	0	0	0	0	0	0	0
Other	32	3,150	0	0	0	0	32	3,197	32	3,293	0	96
Subtotal, Other Research	184	21,660	14	1,158	0	0	184	21,987	185	22,647	1	660
Total Research Grants	1,254	407,038	160	74,005	114	54,807	1,237	418,485	1,246	428,532	9	10,047
Research Training:	FTTPs		FTTPs		FTTPs		FTTPs		FTTPs			
Individual awards	64	3,010	0	0	0	0	64	3,040	64	3,220	0	180
Institutional awards	257	12,504	6	366	6	366	257	12,628	257	13,376	0	748
Total, Training	321	15,514	6	366	6	366	321	15,668	321	16,596	0	928
Research & development contracts	55	22,679	0	0	1	1,000	55	23,973	55	26,812	0	2,839
(SBIR/STTR)	(0)	(20)	(0)	(0)	(0)	(0)	(0)	(136)	(0)	(136)	(0)	(0)
	FTEs		FTEs		FTEs		FTEs		FTEs		FTEs	
Intramural research	142	54,124	0	483	0	175	138	54,944	143	56,702	5	1,758
Research management and support	96	25,341	0	274	0	1,250	93	25,784	98	27,073	5	1,289
Construction		0		0		0		0		0		0
Buildings and Facilities		0		0		0		0		0		0
Total, NIAMS	238	524,696	0	75,128	0	57,598	231	538,854	241	555,715	10	16,861

NATIONAL INSTITUTES OF HEALTH
National Institute of Arthritis and Musculoskeletal and Skin Diseases
BA by Program
(Dollars in thousands)

Extramural Research	FY 2007 Actual FTEs	FY 2007 Actual Amount	FY 2008 Actual FTEs	FY 2008 Actual Amount	FY 2009 Actual FTEs	FY 2009 Actual Amount	FY 2009 Comparable FTEs	FY 2009 Comparable Amount	FY 2010 Enacted FTEs	FY 2010 Enacted Amount	FY 2011 PB FTEs	FY 2011 PB Amount	Change FTEs	Change Amount
Detail:														
Arthritis and Rheumatic Diseases		$135,318		$119,670		$124,240		$124,433		$128,036		$131,896		3,860
Skin Biology and Diseases		66,783		59,808		65,324		65,425		67,321		$69,351		2,030
Muscle Biology and Diseases		73,242		71,189		71,954		72,066		74,154		$76,390		2,236
Musculoskeletal Biology and Diseases		90,877		116,720		114,651		114,830		118,155		$121,718		3,563
Bone Biology and Diseases		66,210		65,391		68,372		68,477		70,460		$72,585		2,125
Subtotal, Extramural		432,430		432,778		444,541		445,231		458,126		471,940		13,814
Intramural research	131	50,862	135	52,915	142	54,124	142	54,124	138	54,944	143	56,702	5	1,758
Res. management & support	84	24,000	91	24,732	96	25,341	96	25,341	93	25,784	98	27,073	5	1,289
TOTAL	215	507,292	226	510,425	238	524,006	238	524,696	231	538,854	241	555,715	10	16,861

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

Major Changes in the Fiscal Year 2011 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 2011 budget request for NIAMS, which is $16.861 million more than the FY 2010 Estimate, for a total of $555.715 million.

Research Project Grants (+$8.165 million; total $362.915 million): NIAMS will support a total of 1,021 Research Project Grant (RPG) awards in FY 2011. Noncompeting awards will increase by 51 awards and $20.833 million. Competing RPGs will decrease by 44 awards and $13.213 million. The NIH budget policy for RPGs in FY 2011 is to provide an inflationary increase of 2% in noncompeting awards and allow a 2% increase in the average cost of competing RPGs. NIAMS will continue to support new investigators and to maintain an adequate number of competing RPGs.

Research Training (+$.928 million; total $16.596 million): NIAMS will support 321 pre- and postdoctoral trainees in full-time training positions, the same number as in FY 2009. Stipend levels for NRSA trainees will increase by 6 percent over FY 2010 levels.

Intramural Research (+$1.758 million; total $56.702 million): NIAMS will continue to identify areas of potential savings within the Intramural Research Program which will allow us to achieve our program goals and accomplishments. As outlined in the Justification Narrative for the Intramural Research Program area, NIAMS will also pursue new opportunities in genome research.

Research Management and Support (+$1.289 million; total $27.073 million): Research Management and Support will receive an increase to help cover the costs of pay and other increases.

NATIONAL INSTITUTES OF HEALTH
National Institute of Arthritis and Musculoskeletal and Skin Diseases
Summary of Changes

FY 2010 estimate				$538,854,000
FY 2011 estimated budget authority				555,715,000
Net change				16,861,000
	2010 Current Estimate Base		Change from Base	
CHANGES	FTEs	Budget Authority	FTEs	Budget Authority
A. Built-in:				
1. Intramural research:				
a. Annualization of January 2010 pay increase		$20,541,000		$124,000
b. January FY 2011 pay increase		20,541,000		216,000
c. Zero less days of pay (n/a for 2011)		20,541,000		0
d. Payment for centrally furnished services		9,204,000		184,000
e. Increased cost of laboratory supplies, materials, and other expenses		25,199,000		403,000
Subtotal				927,000
2. Research management and support:				
a. Annualization of January 2010 pay increase		$12,780,000		$77,000
b. January FY 2011 pay increase		12,780,000		134,000
c. Zero less days of pay (n/a for 2011)		12,780,000		0
d. Payment for centrally furnished services		4,226,000		85,000
e. Increased cost of laboratory supplies, materials, and other expenses		8,778,000		140,000
Subtotal				436,000
Subtotal, Built-in				1,363,000

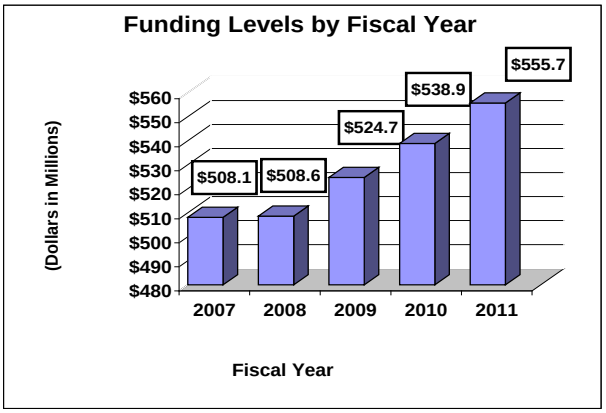
NATIONAL INSTITUTES OF HEALTH
National Institute of Arthritis and Musculoskeletal and Skin Diseases

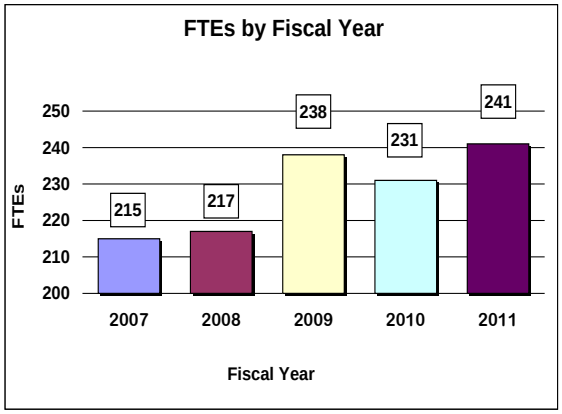
Summary of Changes--continued

CHANGES	2010 Current Estimate Base		Change from Base	
	No.	Amount	No.	Amount
B. Program:				
1. Research project grants:				
a. Noncompeting	703	$249,568,000	51	$20,887,000
b. Competing	274	92,559,000	(44)	(13,213,000)
c. SBIR/STTR	36	12,623,000	1	491,000
Total	1,013	354,750,000	8	8,165,000
2. Research centers	40	41,748,000	0	1,222,000
3. Other research	184	21,987,000	1	660,000
4. Research training	321	15,668,000	0	928,000
5. Research and development contracts	55	23,973,000	0	2,839,000
Subtotal, extramural				13,814,000
	FTEs		FTEs	
6. Intramural research	138	54,944,000	5	831,000
7. Research management and support	93	25,784,000	5	853,000
8. Construction		0		0
9. Buildings and Facilities		0		0
Subtotal, program		538,854,000		15,498,000
Total changes	231		10	16,861,000

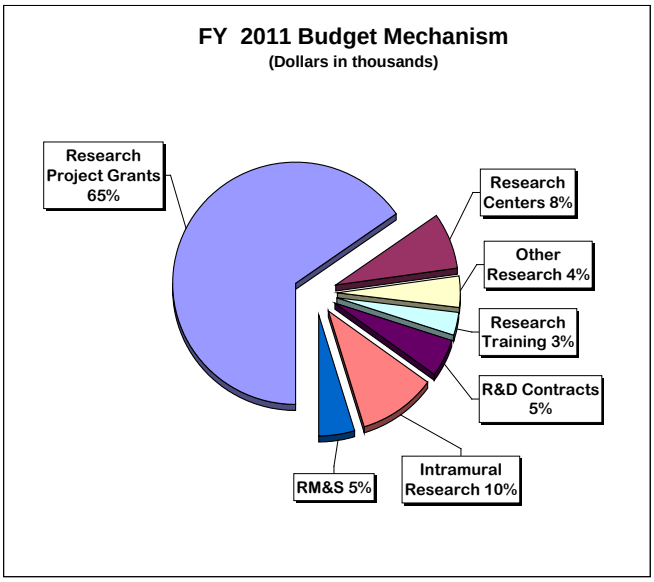
Fiscal Year 2011 Budget Graphs

History of Budget Authority and FTEs:

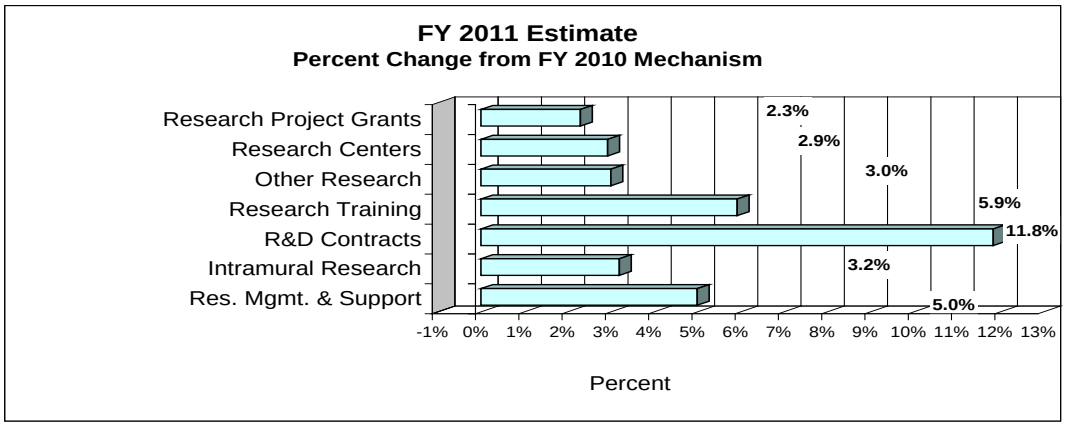




Distribution by Mechanism:



Change by Selected Mechanisms:



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Justification of Budget Request
National Institute of Arthritis and Musculoskeletal and Skin Diseases

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

Budget Authority:

	FY 2009 Appropriation	FY 2010 Appropriation	FY 2011 President's Budget	FY 2011 +/- FY 2010
BA	$524,696,000	$538,854,000	$555,715,000	+$16,861,000
FTE	238	231	241	+10

This document provides justification for the Fiscal Year (FY) 2011 activities of the National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS), including HIV/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.

DIRECTOR'S OVERVIEW

The National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS) supports a broad range of research, training, and information dissemination activities related to arthritis, musculoskeletal, and skin diseases. Some are rare disorders, but many are very common, and all have a major influence on the quality of people's lives. Diseases addressed by NIAMS affect individuals of all ages, of all racial and ethnic backgrounds, and across all economic strata; many disproportionately affect women and minorities. Over the years, NIAMS-funded research teams have made significant progress in uncovering the causes of and developing new treatments for many disorders of the bones, muscles, joints, and skin.

The NIAMS constructed its FY 2011 budget to support the NIH Director's five themes.

Recent Progress

Building on the success of FY 2008 and 2009 pilot initiatives to promote partnerships among fields that share interests, but historically do not interact, the NIAMS expanded its FY 2010 Building Interdisciplinary Research Teams (BIRT) initiative to researchers from all NIAMS areas. Integration of scientific groups holds the promise of opening avenues of inquiry and, in the process, may empower the biomedical research community to develop new disciplines and approaches with which to tackle increasingly complex questions.

To accelerate translation of basic research in musculoskeletal and skin tissue engineering and regenerative medicine into treatments, the NIAMS is encouraging small businesses to propose pre-clinical tissue engineering and regenerative medicine studies that could lead immediately to phase I human clinical trials. As part of this FY 2010 effort, the NIAMS plans to support the development of pre-clinical animal models to assess safety and efficacy of potential commercial products in musculoskeletal and skin tissue engineering and regenerative medicine.

The NIAMS also is encouraging investigators to design experiments related to the NIAMS mission that use existing resources developed through the Nation's considerable investment in large clinical trials. Specifically, the Institute is offering an accelerated process by which investigators can propose innovative, ground breaking projects that need to begin quickly if they are to make full use of the unique resources that an already approved study is establishing.

One element of improving the Nation's health is to support clinical studies on which physicians can rely when discussing treatment options with patients. Before the Spine Patient Outcomes Research Trial (SPORT), many who had low back pain were conflicted about surgery. Thus far, SPORT has shown that surgery is superior to nonoperative treatments for intervertebral disk herniation (a common cause of debilitating low back pain in working-age adults) and lumbar spinal stenosis, which often afflicts older Americans. Moreover, SPORT's results are reassuring to those patients who are reluctant to undergo an operation, as they show that people who have one of these conditions are not subjecting themselves to further damage if they adopt a "wait-and-see" approach before committing to surgery.

The NIAMS intramural research program (IRP) has recently completed two genome-wide association studies (GWAS). A study on Behçet's disease—a complex disorder of inflammation affecting skin, joints, eyes, gastrointestinal tract, lungs, and vasculature—found two new genetic locations that confer susceptibility to this condition in specific populations. Recognition of one of these locations suggests a new therapy for it. The other GWAS, performed by a consortium of researchers from throughout the United States, focused on rheumatoid arthritis. These studies have led to the identification of several genetic locations that may provide new therapeutic targets.

Future Directions

NIAMS is actively encouraging its researchers to apply the unprecedented opportunities in genomics and other high-throughput technologies to explain fundamental biologic mechanisms in health and disease. In the NIAMS IRP, for example, sample collection is beginning for a GWAS of systemic onset juvenile idiopathic arthritis (SoJIA), a type of rheumatoid arthritis that affects children, is accompanied by fever, and can include rashes and enlargement of the lymph nodes, liver, spleen, heart, and lungs.

In FY 2009 and 2010, NIAMS solicited input about the process by which the Institute identifies new clinical research directions and gathers feedback on emerging needs and

opportunities, existing gaps, and obstacles in clinical trials related to its mission. Plans for FY 2011 include implementing a strategy to ensure that its portfolio continues to address pressing questions that translate basic science discoveries into treatments, or could guide the decision making of health care providers and improve patient care.

The success of biomedical research depends on empowering the next generation of scientists by providing them with robust training experiences. To this end, the NIAMS has taken steps to address the structure and review criteria for the Ruth L. Kirschstein National Research Service Award Institutional Research Training Grants, or T32 grants, that it will award in FY 2011 and beyond.

Other plans for FY 2011 include the possibility of supporting awards under a trans-NIH solicitation that the NIAMS spearheaded in FY 2009, in partnership with the National Aeronautics and Space Administration (NASA). This initiative encourages biomedical researchers to develop projects that could be conducted in the microgravity environment of the International Space Station (ISS). When the ISS becomes fully operational in 2011, it will provide a unique setting where NIH-funded researchers can explore fundamental questions about human health issues, including how the body heals itself, fights infection, or develops diseases such as osteoporosis.

Overall Budget Policy: The 2011 request for NIAMS is $555.715 million or 3.1 percent over the FY 2010 Enacted level. Investigator-initiated research project grants and research conducted by new scientists continue to be the Institute's highest priorities. In FY 2011, the NIAMS will strive to equalize success rates between new and experienced investigators submitting new R01 or equivalent applications. In FY 2011 NIAMS will continue its policy of not accepting unsolicited applications for new program project grants, and competing continuation applications for program project grants will only be considered for a second competing award for a total project period of up to 10 years. As in previous years, the NIAMS will reserve a portion of its budget to support high priority research or meritorious applications beyond the established payline. Areas of special emphasis include genome-wide association studies and translational research, particularly in the areas of tissue engineering and regenerative medicine. 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.

Program Descriptions and Accomplishments

Arthritis and Rheumatic Diseases: The goals of this program are to advance high-quality basic, translational, and clinical biomedical and biopsychosocial research to treat and prevent arthritis and rheumatic diseases. The program uses new insights in the fields of genetics, genomics, and biomarkers as important indicators of disease occurrence, disease progression, and response to treatment, which may also identify potential therapeutic targets. NIAMS pursues new opportunities that identify risk factors

for these disorders, to enhance disease prediction, and advance prevention strategies. In FY 2009, the Institute organized a session at its annual scientific retreat to explore novel approaches in clinical trials that target immune dysfunction in rheumatic diseases. NIAMS will collaborate with the extramural community to broaden the discussion of immune system targets, as well as potential personalized medicine approaches through pharmacogenomics. NIAMS continues to support research on the causes of rheumatoid arthritis and juvenile idiopathic arthritis which could lead to therapeutic interventions that would inhibit the irreversible effects of these diseases.

Budget Policy: The FY 2011 budget estimate for this program is $131.896 million, an increase of $3.860 million or 3.02 percent over the FY 2010 Enacted level.

NIAMS plans for FY 2011 include continued support for the replication of genome-wide association study (GWAS) results and fine-mapping of identified gene associations, which will inform further research in disease susceptibility and therapeutic development. The NIAMS will support testing and validation of tools to measure patient-reported outcomes—created by the NIH Roadmap's Patient-Reported Outcomes Measurement Information System (PROMIS) initiative—in the diverse populations represented by the NIAMS portfolio, including arthritis and rheumatic diseases. The Institute also will encourage interactions in the research community to address the effectiveness of rheumatoid arthritis treatments in relation to genetic differences across patient populations.

Genome-Wide Association Studies

FY 2010 Level: $8.920 million
FY 2011 Level: $9.200 million
Change: $0.280 million

Many health problems are influenced by genetic susceptibility. Over the last few years, genome-wide association approaches have become a widely used scientific tool, to find gene variants that may confer disease risk. This information also lends understanding to molecular mechanisms of disease that will guide improvements in diagnosis and therapies. NIAMS-funded researchers have recently uncovered clues about the genetic underpinnings of risks for rheumatoid arthritis, systemic lupus erythematosus, psoriasis, systemic scleroderma, and Behçet's disease. In FY 2009, an ongoing NIAMS initiative began support of genome-wide analyses of existing data sets, which has allowed efficient pursuit of risk genes in juvenile idiopathic arthritis, rheumatoid arthritis, ankylosing spondylitis, psoriasis, osteoporosis, and sarcopenia (low muscle mass). An FY 2010 initiative is encouraging researchers to conduct further analyses of disease-associated gene regions to identify individual gene variations responsible for a disease or trait.

Some of the most promising areas of research that benefit from genome-wide association studies relate to autoimmunity, in which the body's protective mechanisms against pathogens attack its own cells and tissues. This is characteristic of several rheumatic disorders, including rheumatoid arthritis, lupus, and ankylosing spondylitis. Many rheumatic disease risk genes identified by NIAMS-supported researchers through genome-wide association studies are involved with immune function. In addition, particular genes confer greater risk in some racial and ethnic populations than others. These findings will provide essential information for pharmacogenomics research, which studies how an individual patient's genome influences drug responses. Hence, continued research in this field will contribute to the development of personalized medicine approaches.

Musculoskeletal Biology and Diseases: The program focuses on both understanding the fundamental biology of tissues that constitute the musculoskeletal system, and applying this knowledge to a variety of diseases and conditions including osteoarthritis. It studies the causes and treatment of acute and chronic injuries, such as carpal tunnel syndrome, repetitive stress injury, and low back pain. The program supports the development of new technologies, including methods of imaging bone and cartilage to improve the diagnosis and treatment of skeletal disorders, and to facilitate repair of damage caused by trauma to otherwise healthy musculoskeletal tissue. In FY 2009, NIAMS and other NIH components extended the Osteoarthritis Initiative (OAI) through FY 2014. Continuation of this public-private partnership allows investigators to supplement the data, which they collected annually from approximately 4,800 people over four years, with an additional four years worth of information. The entire research community has access to the OAI data for exploring the natural progression of osteoarthritis and gathering information on its risk factors.

Budget Policy: The FY 2011 budget estimate for this program is $121.718 million, an increase of $3.563 million or 3.02 percent over the FY 2010 Enacted level. Program plans for FY 2011 include collaborating with professional organizations to examine clinical research needs related to acute and chronic neck and back disorders. Other efforts include exploring a framework for subsequent studies of people who are at risk of post-traumatic knee osteoarthritis. The NIAMS also will continue to promote the use of the Osteoarthritis Initiative data and images by fostering collaborations between the broader scientific community and Osteoarthritis Initiative researchers.

Building Interdisciplinary Research Teams (BIRT)

FY 2010 Level: $2.000 million
FY 2011 Level: $2.000 million
Change: ---

The scale and complexity of today's research questions, and their answers, demand that the NIH explore new models for collaborative science. In FY 2008, the NIAMS started a program—Building Interdisciplinary Research Teams (BIRT)—to promote partnerships among fields that share interests, but historically do not interact. Under BIRT, the Institute encourages its investigators to form collaborations that will move their research in new directions and allow them to make advances beyond the progress that would come from their individual laboratories. The NIAMS limited the first two rounds of one-year awards (FY 2008 and FY 2009) to teams that bridged specific research topics (such as autoimmunity and systems biology; imaging technologies and soft tissue biology; immunology and regenerative medicine; and tissue engineering and developmental biology).

In FY 2010, the NIAMS expanded BIRT to basic or translational team-science across all of its mission areas. To be eligible under the broader program, a project must propose a partnership among investigators who do not have a history of collaboration. Their primary training, research, and experience must be in different disciplines. For example, an experimental biologist might collaborate with a mathematician, physicist, or engineer.

As the funding for the first award periods expires, the NIAMS will evaluate BIRT's effectiveness. Expectations for the program include development of collaborative research projects; pursuit of new research directions by BIRT recipients; creation of resources and facilities shared among scientific communities; and establishment of interdisciplinary meetings or workshops for the exchange of ideas, dissemination of information, and formation of additional research teams.

Bone Biology and Diseases: The program covers a broad spectrum of research designed to better understand genetic and cellular mechanisms involved in the build-up and break-down of bone. It addresses regulation of bone remodeling; bone formation, bone resorption, and mineralization; and effects of hormones, growth factors, and cytokines on bone cells. Through the program, NIAMS supports prospective cohort studies including the Framingham Osteoporosis Study, the osteoporosis component of the Rochester Epidemiology Project, and Mr. OS, an investigation into osteoporosis and other age-related diseases in men. These longstanding efforts (begun in 1986 and 2000, respectively) continue to provide data about osteoporosis diagnosis, treatment, and prevention. Mr. OS investigators, for example, published information in FY 2009 that is relevant to the U.S. Preventive Services Task Force's efforts to provide guidance on using bone mineral density to assess fracture risk in men.

Budget Policy: The FY 2011 budget estimate for this program is $72.585 million, an increase of $2.125 million or 3.02 percent over the FY 2010 Enacted level. Program plans for FY 2011 include continued support of several epidemiologic studies of fracture risk in women and men, as noted above. The NIAMS plans to build upon the findings of these and other large population study samples by encouraging researchers to connect information regarding the genetic makeup of study participants and their risks of fracture through genome-wide association studies of bone mass and fracture risk. It also will partner with the National Institute on Aging to promote research on how bone health influences, and is affected by, other conditions including diabetes, obesity, anorexia nervosa, and depression.

Muscle Biology and Diseases: The program supports a wide range of basic, translational, and clinical research projects in skeletal muscle biology and diseases. It focuses on fundamental biology of muscle development, physiology, and muscle imaging. Its overarching objective is to advance the understanding of, and, ultimately, to prevent and treat muscular dystrophies, inflammatory myopathies, muscle ion channel diseases, and muscle disorders, such as disuse atrophy and age-related loss of muscle mass. Program activities in FY 2010 will include funding a new Senator Paul D. Wellstone Muscular Dystrophy Cooperative Research Center. NIAMS also will maintain a pipeline of basic and pre-clinical discoveries that researchers can develop into treatments, and will continue to collaborate with the National Institute of Neurological Disorders and Stroke on efforts to encourage investigator-initiated proposals for translational research on muscular dystrophies.

Budget Policy: The FY 2011 budget estimate for this program is $76.390 million, an increase of $2.236 million or 3.02 percent over the FY 2010 Enacted level. For FY 2011, the program will continue to participate in the Senator Paul D. Wellstone Muscular Dystrophy Research Center program. It also will continue to support training and career development in muscular dystrophies including, but not limited to, Duchenne, myotonic, facioscapulohumeral, and congenital disease. Other FY 2011 activities will continue to promote research on the mechanisms of muscular dystrophies, characterization of disease phenotypes, management of disease complications, and development of new

therapies. The NIAMS also is fostering preclinical development and testing of potential treatments against the muscular dystrophies and inflammatory myopathies. It remains committed to supporting research on non-dystrophic skeletal muscle diseases such as channelopathies and inflammatory and mitochondrial myopathies, and on muscle wasting resulting from disuse or systemic diseases.

Skin Biology and Diseases: This program supports a broad portfolio of basic, translational, and clinical research in skin, including work on the developmental and molecular biology of skin; the study of skin as an immune organ; and the genetics of skin diseases. The Institute is pursuing opportunities in developing artificial skin, and imaging technologies for diagnosing and tracking progression of skin diseases. In FY 2009, a NIAMS-facilitated consortium of leading researchers in psoriasis genetics discovered genes for disease risk, which may provide insights into novel therapeutic approaches. The Institute also organized a session on stem cells at its annual scientific retreat, to explore opportunities to use easily-accessible skin cells as a source of pluripotent stem cells. These cells, which have the potential to become any type of cell in the body, could guide studies in disease pathogenesis, regenerative medicine, tissue engineering, and cell-based therapies for a wide range of disorders. NIAMS continues to support several projects that study connective tissue disorders, including Marfan syndrome—a heritable disease characterized by highly flexible skin, and severe skeletal and cardiovascular complications—and pediatric hemangiomas, which are benign, blood vessel tumors in the skin that can occasionally result in permanent, significant abnormalities when facial structures are involved.

Budget Policy: The FY 2011 budget estimate for this program is $69.351 million, an increase of $2.030 million or 3.02 percent over the FY 2010 Enacted level. NIAMS plans for FY 2011 include continued support for studies on the interactions between the skin and other parts of the body (such as the immune system, the cardiovascular system and the nervous system) under normal, healthy conditions, as well as a consequence of certain illnesses (e.g., eczema, psoriasis). In addition, the Institute will enhance the transfer of laboratory findings related to skin tissue engineering and regenerative medicine to the clinic, by funding research with animal models that mimic human biology.

Intramural Research Program: The two-fold mission of this program is to conduct innovative basic, translational, and clinical research relevant to the health concerns of the Institute; and, to provide training for investigators who are interested in related research careers. The program conducts clinical studies on the genetics, etiology, pathogenesis, and treatment of a variety of rheumatic, autoimmune, inflammatory, joint, skin, and muscle diseases. Over the past year, the program has added clinical staff with expertise in orthopaedic surgery, an area that remains a high priority for the Institute. In addition, NIAMS continues to play a leadership role in the new, multidisciplinary, trans-NIH Center for Human Immunology, Autoimmunity, and Inflammation (CHI), which is bringing together scientists from several NIH institutes who are using common approaches to study multiple disease systems. In FY 2009, the CHI

hosted a conference entitled, “Meeting the Human Immunology Challenge,” in which many NIAMS intramural researchers participated.

Budget Policy: The FY 2011 budget estimate for this program is $56.702 million, an increase of $1.758 million or 3.20 percent over the FY 2010 Enacted level. NIAMS plans for FY 2011 include a continued focus on translational research, in order to facilitate patient-oriented studies in the areas of arthritis, musculoskeletal, and skin diseases, including their genetic, inflammatory, and immune mechanisms. NIAMS will also continue its commitment to multidisciplinary training of rheumatology research fellows, including interactions with other NIH intramural training programs with common scientific interests, to strengthen the pipeline of highly qualified physician-scientists in this field. The Institute's intramural research program also anticipates building upon its recent ground-breaking, collaborative studies, to uncover more information on the genetic underpinnings of those diseases of interest to NIAMS. Utilizing new technologies that are able to read millions of DNA base pairs in just a few hours, intramural scientists will investigate how the genome is regulated, particularly as it relates to the maturation and differentiation of cells found in the skin and immune system.

NIAMS Intramural Research Program

FY 2010 Level: $54.944 million
FY 2011 Level: $56.702 million
Change: $ 1.758 million

The NIAMS Intramural Research Program (IRP) continues to support a wide range of activities that span basic, translational, and clinical research, as well as provide training opportunities. For example, using a new genome sequencing technology, NIAMS IRP scientists have recently discovered clues about one type of immune system cell called T lymphocytes—this type of information can be used to develop new treatments for diseases, particularly autoimmune and infectious diseases.

In another effort, NIAMS scientists have discovered a new autoinflammatory syndrome. The researchers have termed the disorder DIRA (deficiency of the interleukin-1 receptor antagonist). Most of the children with DIRA begin to display a constellation of serious and potentially fatal symptoms from birth to 2 weeks of age. Once identified, the scientists successfully treated patients with anakinra, a drug used for rheumatoid arthritis. Future work will build off of this discovery and should lead to early recognition of DIRA and initiation of life-saving treatment. Genetic screening for this disease in the respective populations may also be justified. Finally, although DIRA is rare, its continued study should shed light on the inflammatory mechanisms in more common diseases that have similar pathologies and pose significant health care challenges.

The NIAMS Cardozo Community Health Center (CHC) in Washington, D.C., not only provides local residents access to specialty-care and science-based health information, but it also enhances the Institute’s efforts to train the next generation of health professionals. The CHC enables clinical fellows to train within a unique community-based learning environment in rheumatic diseases. The CHC recently welcomed three new trainees who will complete clinical rotations in consultative practice, pediatric rheumatology, and community-based rheumatology over the coming months.

RMS: NIAMS' RMS funds the scientific, administrative management, and information technology expenses associated with day-to-day operations. It finances long-term

investments in the research enterprise, including the review and financial management of applications for grants and contracts, and dissemination of research results to the American public. In FY 2009, the Institute managed more than 1,254 research grants and centers, as well as 55 research and development contracts and 321 individual and institutional full-time research training positions. NIAMS supports 528 clinical research studies, including 72 clinical trials. In FY 2010, NIAMS will release a new Long-Range Plan for FY 2010-2014. The plan will serve as a broad scientific outline for NIAMS by identifying compelling research opportunities and needs that will inform NIAMS' priority-setting process, while enabling the Institute to adapt to the rapidly changing biomedical and behavioral science landscapes. Over time, it will help propel research progress related to NIAMS mission areas.

Budget Policy: The FY 2011 budget estimate for this program is $27.073 million, an increase of $1.289 million or 5.00 percent over the FY 2010 Enacted level. In FY 2011, the NIAMS will continue to implement its new Multicultural Outreach Initiative which has been designed to improve access to and availability of meaningful health information for racial and ethnic minority populations. Additional goals include raising awareness of the importance of research as the foundation for progress in achieving better bone, joint, muscle, and skin health, and enhancing involvement of community, voluntary, and professional organizations, and other governmental agencies in multicultural outreach efforts. The Institute also will continue to sponsor roundtable discussions and a scientific retreat with extramural investigators and lay representatives to inform the research priority-setting and strategic planning process.

Recovery Act Implementation

Recovery Act Funding: $132.7 million

In FY 2009, NIAMS received $132.7 million under the Recovery Act. Of this amount, $75.1 million was obligated in FY 2009 and $57.6 million will be obligated in FY 2010. Through ARRA, researchers are expanding their studies, developing new collaborations, and hiring faculty. Some funds are supporting hands-on laboratory experiences for teachers and students in local communities, thereby generating enthusiasm for research in young people who may become the next generation of scientists. Other efforts will create resources for investigators to mine long after the two-year projects are complete. For example, NIAMS awarded major grants for research infrastructure that will foster studies of rheumatic arthritis and juvenile idiopathic arthritis. Another award brings together clinicians who will generate evidence that will guide treatment strategies for people who have psoriasis. One research team is creating a tool that investigators can use to more accurately study the stresses that lead to herniated discs and back pain, while elsewhere, a group is establishing a collection of mouse models that researchers can use to identify genes that contribute to cartilage healing after an injury. NIAMS also dedicated some money to leverage earlier investments in large population-based studies. As ARRA-funded scientists collect information about the genetic makeup of study volunteers, they are making the data available for the entire research community to use in genome-wide association studies to uncover the genetic underpinnings of arthritis and musculoskeletal and skin diseases and lead to new treatments and cures.

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Budget Authority by Object

	FY 2010 Enacted	FY 2011 PB	Increase or Decrease
Total compensable workyears:			
Full-time employment	231	241	10
Full-time equivalent of overtime and holiday hours	0	0	0
Average ES salary	$181,283	$183,821	$2,538
Average GM/GS grade	11.7	11.7	0.0
Average GM/GS salary	$91,316	$92,602	$1,286
Average salary, grade established by act of July 1, 1944 (42 U.S.C. 207)	$69,013	$69,979	$966
Average salary of ungraded positions	121,390	123,044	1,654

OBJECT CLASSES	FY 2010 Estimate	FY 2011 Estimate	Increase or Decrease
Personnel Compensation:			
11.1 Full-time permanent	$14,079,000	$14,965,000	$886,000
11.3 Other than full-time permanent	8,661,000	9,139,000	478,000
11.5 Other personnel compensation	777,000	826,000	49,000
11.7 Military personnel	285,000	304,000	19,000
11.8 Special personnel services payments	2,754,000	2,899,000	145,000
Total, Personnel Compensation	26,556,000	28,133,000	1,577,000
12.0 Personnel benefits	6,488,000	6,875,000	387,000
12.2 Military personnel benefits	277,000	296,000	19,000
13.0 Benefits for former personnel	0	0	0
Subtotal, Pay Costs	**33,321,000**	**35,304,000**	**1,983,000**
21.0 Travel and transportation of persons	836,000	852,000	16,000
22.0 Transportation of things	183,000	186,000	3,000
23.1 Rental payments to GSA	0	0	0
23.2 Rental payments to others	0	0	0
23.3 Communications, utilities and miscellaneous charges	529,000	539,000	10,000
24.0 Printing and reproduction	131,000	135,000	4,000
25.1 Consulting services	1,335,000	1,372,000	37,000
25.2 Other services	4,617,000	4,703,000	86,000
25.3 Purchase of goods and services from government accounts	46,425,000	49,137,000	2,712,000
25.4 Operation and maintenance of facilities	288,000	292,000	4,000
25.5 Research and development contracts	14,706,000	15,707,000	1,001,000
25.6 Medical care	448,000	455,000	7,000
25.7 Operation and maintenance of equipment	1,687,000	1,713,000	26,000
25.8 Subsistence and support of persons	0	0	0
25.0 Subtotal, Other Contractual Services	**69,506,000**	**73,379,000**	**3,873,000**
26.0 Supplies and materials	4,962,000	5,039,000	77,000
31.0 Equipment	2,288,000	2,324,000	36,000
32.0 Land and structures	0	0	0
33.0 Investments and loans	0	0	0
41.0 Grants, subsidies and contributions	427,098,000	437,957,000	10,859,000
42.0 Insurance claims and indemnities	0	0	0
43.0 Interest and dividends	0	0	0
44.0 Refunds	0	0	0
Subtotal, Non-Pay Costs	**505,533,000**	**520,411,000**	**14,878,000**
Total Budget Authority by Object	**538,854,000**	**555,715,000**	**16,861,000**

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
Personnel Compensation:			
Full-time permanent (11.1)	$14,079,000	$14,965,000	$886,000
Other than full-time permanent (11.3)	8,661,000	9,139,000	478,000
Other personnel compensation (11.5)	777,000	826,000	49,000
Military personnel (11.7)	285,000	304,000	19,000
Special personnel services payments (11.8)	2,754,000	2,899,000	145,000
Total Personnel Compensation (11.9)	**26,556,000**	**28,133,000**	**1,577,000**
Civilian personnel benefits (12.1)	6,488,000	6,875,000	387,000
Military personnel benefits (12.2)	277,000	296,000	19,000
Benefits to former personnel (13.0)	0	0	0
Subtotal, Pay Costs	**33,321,000**	**35,304,000**	**1,983,000**
Travel (21.0)	836,000	852,000	16,000
Transportation of things (22.0)	183,000	186,000	3,000
Rental payments to others (23.2)	0	0	0
Communications, utilities and miscellaneous charges (23.3)	529,000	539,000	10,000
Printing and reproduction (24.0)	131,000	135,000	4,000
Other Contractual Services:			
Advisory and assistance services (25.1)	1,335,000	1,372,000	37,000
Other services (25.2)	4,617,000	4,703,000	86,000
Purchases from government accounts (25.3)	32,999,000	34,100,000	1,101,000
Operation and maintenance of facilities (25.4)	288,000	292,000	4,000
Operation and maintenance of equipment (25.	1,687,000	1,713,000	26,000
Subsistence and support of persons (25.8)	0	0	0
Subtotal Other Contractual Services	**40,926,000**	**42,180,000**	**1,254,000**
Supplies and materials (26.0)	4,961,000	5,038,000	77,000
Subtotal, Non-Pay Costs	47,566,000	48,930,000	1,364,000
Total, Administrative Costs	**80,887,000**	**84,234,000**	**3,347,000**

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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	$538,854,000	Indefinite	$555,715,000
National Institute of Arthritis and Musculoskeletal and Skin Diseases	Section 402(a)	42§281	Indefinite		Indefinite	
Total, Budget Authority				538,854,000		555,715,000

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Appropriations History

Fiscal Year	Budget Estimate to Congress	House Allowance	Senate Allowance	Appropriation
2002	$443,565,000	$440,144,000	$460,202,000	$448,865,000
Rescission				(617,000)
2003	485,851,000	485,851,000	489,324,000	489,324,000
Rescission				(3,181,000)
2004	502,778,000	502,778,000	505,000,000	504,300,000
Rescission				(3,234,000)
2005	515,378,000	515,378,000	520,900,000	515,378,000
Rescission				(4,221,000)
2006	513,063,000	513,063,000	525,758,000	513,063,000
Rescission				(5,131,000)
2007	504,533,000	504,533,000	508,585,000	508,240,000
Rescission				0
2008	508,082,000	516,044,000	519,810,000	508,586,000
Rescission				(9,043,000)
Supplemental				2,705,000
2009	509,080,000	526,583,000	523,246,000	524,872,000
Rescission				0
2010	530,825,000	543,621,000	533,831,000	539,082,000
Rescission				0
2011	555,715,000			

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	54	52	54
Extramural Program	42	41	44
Intramural Research Program	142	138	143
Total	238	231	241
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
2007	11.6
2008	11.6
2009	11.7
2010	11.7
2011	11.7

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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	177,000	181,283	183,821
GM/GS-15	16	16	16
GM/GS-14	25	25	27
GM/GS-13	35	33	33
GS-12	35	32	34
GS-11	22	20	21
GS-10	0	0	0
GS-9	8	8	10
GS-8	7	7	7
GS-7	11	11	11
GS-6	3	3	3
GS-5	2	2	2
GS-4	2	2	2
GS-3	0	0	0
GS-2	1	1	1
GS-1	0	0	0
Subtotal	167	160	167
Grades established by Act of July 1, 1944 (42 U.S.C. 207):			
Assistant Surgeon General	0	0	0
Director Grade	1	1	1
Senior Grade	0	0	0
Full Grade	3	3	3
Senior Assistant Grade	1	1	1
Assistant Grade	0	0	0
Subtotal	5	5	5
Ungraded	88	88	91
Total permanent positions	171	164	174
Total positions, end of year	261	254	264
Total full-time equivalent (FTE) employment, end of year	238	231	241
Average ES salary	177,000	181,283	183,821
Average GM/GS grade	11.7	11.7	11.7
Average GM/GS salary	88,893	91,316	92,602

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
Management Analyst	GS-9	1	$61,000
Health Science Administrator	GS-14	1	124,000
Ethics Coordinator	GS-14	1	124,000
Adult Rheumatologist	AD	1	230,000
Clinical Fellow	AD	2	66,500
Program Analyst	GS-12	1	84,500
Grants Management Specialist	GS-9	1	61,000
Research Nurse	GS-12	1	84,500
Biologist	GS-11	1	71,500
Total Requested		10	