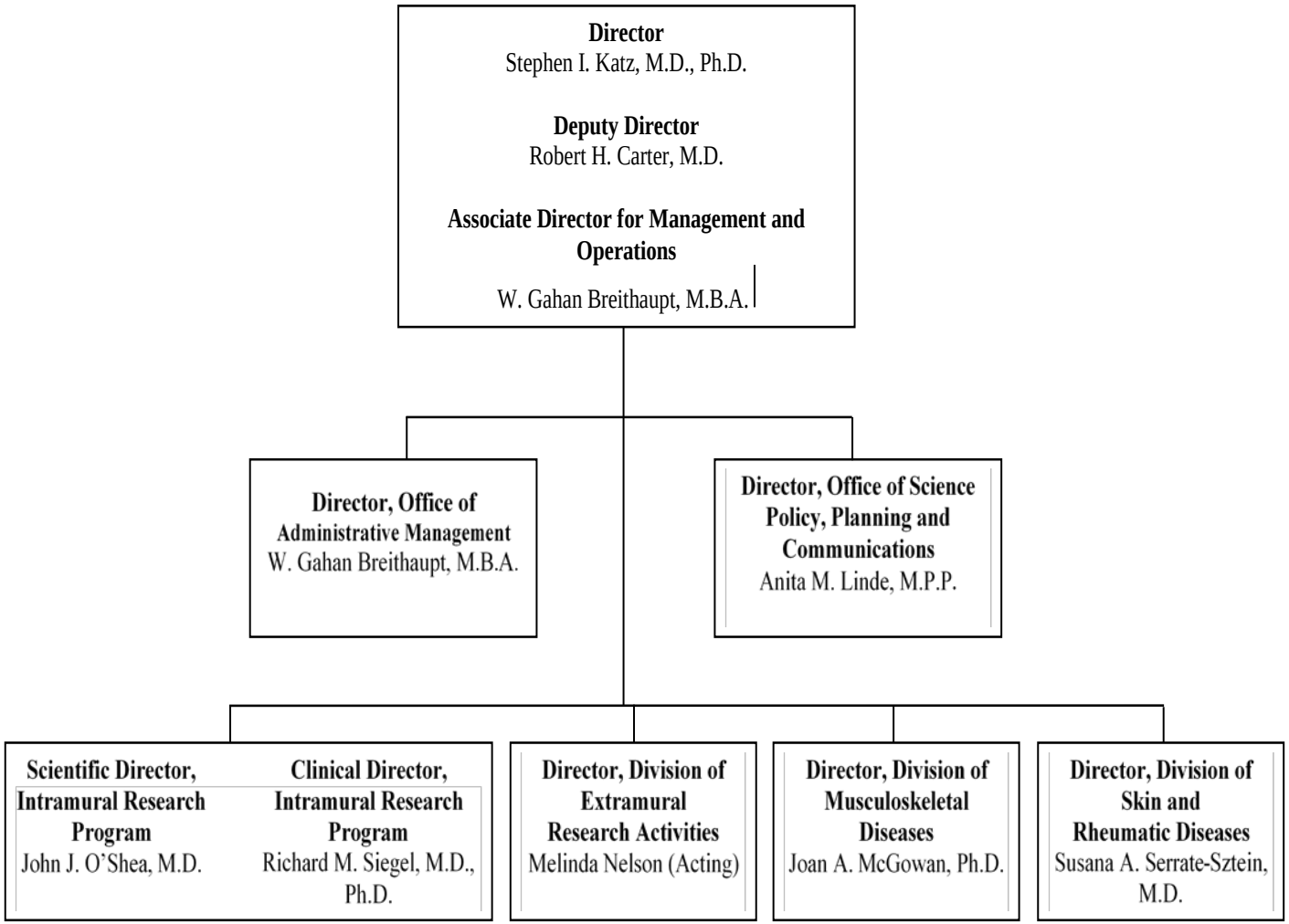
DEPARTMENT OF HEALTH AND HUMAN SERVICES

NATIONAL INSTITUTES OF HEALTH

National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS)

NATIONAL INSTITUTE OF ARTHRITIS AND MUSCULOSKELETAL AND SKIN DISEASES



NATIONAL INSTITUTES OF HEALTH

National Institute of Arthritis and Musculoskeletal and Skin Diseases

For carrying out section 301 and title IV of the PHS Act with respect to arthritis and musculoskeletal and skin diseases, $417,898,000.

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

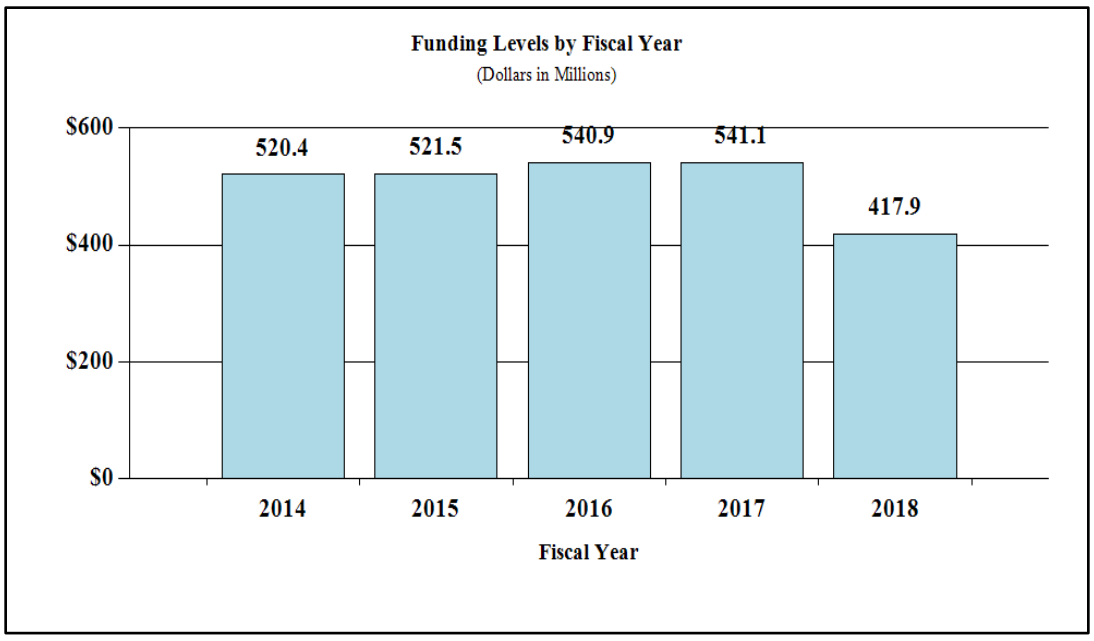
Amounts Available for Obligation[1]
(Dollars in Thousands)

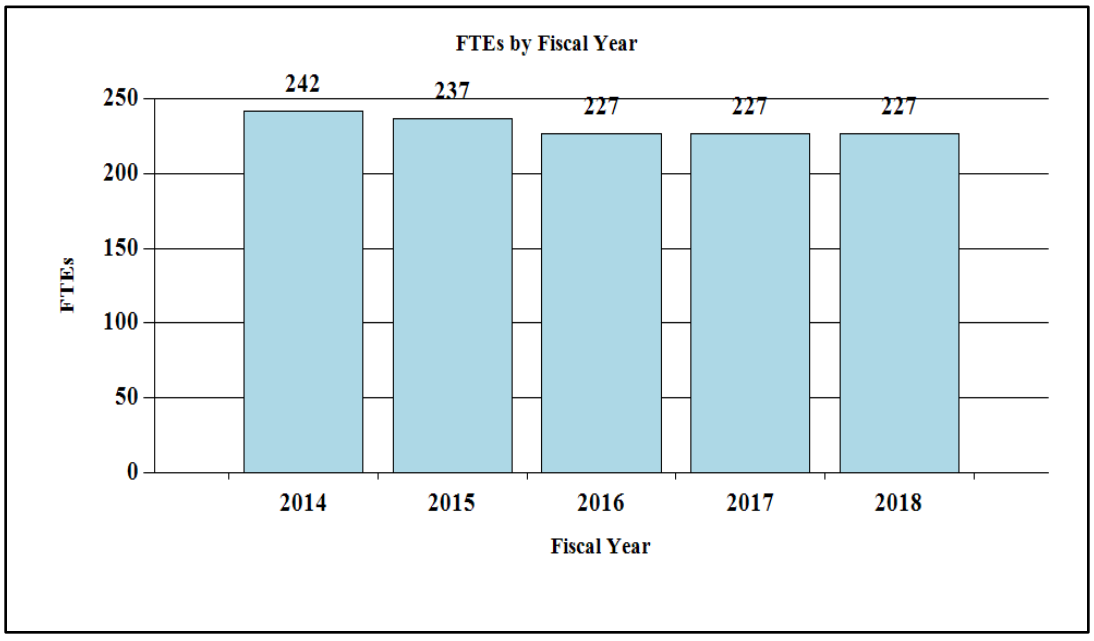
Source of Funding	FY 2016 Final	FY 2017 Annualized CR	FY 2018 President's Budget
Appropriation	$542,141	$542,141	$417,898
Mandatory Appropriation: (non-add)			
Type 1 Diabetes	*(0)*	*(0)*	*(0)*
Other Mandatory financing	*(0)*	*(0)*	*(0)*
Rescission	0	-1,031	0
Sequestration	0	0	0
Zika Intra-NIH Transfer	-750	0	0
Subtotal, adjusted appropriation	$541,391	$541,110	$417,898
OAR HIV/AIDS Transfers	-479	0	0
Subtotal, adjusted budget authority	$540,912	$541,110	$417,898
Unobligated balance, start of year	0	0	0
Unobligated balance, end of year	0	0	0
Subtotal, adjusted budget authority	$540,912	$541,110	$417,898
Unobligated balance lapsing	-37	0	0
Total obligations	$540,874	$541,110	$417,898

[1] Excludes the following amounts for reimbursable activities carried out by this account:
FY 2016 - $1,507 FY 2017 - $1,824 FY 2018 - $1,497

Fiscal Year 2018 Budget Graphs

History of Budget Authority and FTEs:





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

Authorizing Legislation

	PHS Act/ Other Citation	U.S. Code Citation	2017 Amount Authorized	FY 2017 Annualized CR	2018 Amount Authorized	FY 2018 President's Budget
Research and Investigation	Section 301	42§241	Indefinite	$541,110,000	Indefinite	$417,898,000
National Institute of Arthritis and Musculoskeletal and Skin Diseases	Section 401(a)	42§281	Indefinite		Indefinite	
Total, Budget Authority				$541,110,000		$417,898,000

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

Appropriations History

Fiscal Year	Budget Estimate to Congress	House Allowance	Senate Allowance	Appropriation
2008	$508,082,000	$516,044,000	$519,810,000	$517,629,000
Rescission				$9,043,000
Supplemental				$2,075,000
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		$554,846,000	$539,082,000
Rescission				$4,733,461
2012	$547,891,000	$547,891,000	$528,332,000	$536,801,000
Rescission				$1,014,454
2013	$535,610,000		$537,233,000	$535,786,446
Rescission				$1,071,573
Sequestration				($26,892,795)
2014	$540,993,000		$537,398,000	$520,053,000
Rescission				$0
2015	$520,189,000			$521,665,000
Rescission				$0
2016	$533,232,000	$528,137,000	$544,274,000	$542,141,000
Rescission				$0
2017[1]	$541,662,000	$555,181,000	$564,131,000	$542,141,000
Rescission				$1,031,000
2018	$417,898,000			

[1] Budget Estimate to Congress includes mandatory financing.

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 (BA):

	FY 2016 Actual	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2018 +/- FY 2017
BA	$542,141,000	$541,141,000	$417,898,000	-$123,212
FTE	227	227	227	+0

Program funds are allocated as follows: Competitive Grants/Cooperative Agreements; Contracts; Direct Federal/Intramural and Other.

Director's Overview

As the primary Federal agency for supporting medical research on diseases of the bones, joints, muscles, and skin, the National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS) touches the lives of nearly every American. Arthritis limits the activities of approximately 22.7 million adults in the United States each year; medical care and lost wages attributable to musculoskeletal conditions cost Americans an estimated $874 billion annually; and skin conditions such as eczema and psoriasis affect more than 12 percent of people worldwide.[1] A recent study published in the Lancet found that five of the top 15 leading causes of years lived with disability (YLDs) are attributable to conditions within the Institute's portfolio, including low back and neck pain, skin disease, and osteoarthritis.[2] NIAMS is working to enhance health, lengthen life, and reduce illness and disability by supporting basic and translational research, clinical trials that will impact medical practice, training the next generation of bone, joint, muscle, and skin scientists, and disseminating the findings and related health information from the studies it supports to all Americans. The activities described below highlight NIAMS' many efforts to advance public health.

NIAMS is committed to foundational research into the basic biological processes that underlie health and disease. For example, NIAMS researchers are studying the molecules that control cell

[1] Barbour KE, et al. Prevalence of doctor-diagnosed arthritis and arthritis-attributable activity limitation-United States, 2010-2012. MMWR 2013;62 (44):869-873
U.S. Department of Health and Human Services, Agency for Healthcare Research and Quality, Medical Expenditures Panel Survey, 1996-2011, as cited in www.boneandjointburden.org/docs/T10015.14.pdf, accessed November 21, 2016
Vos T, et al. Years lived with disability (YLDs) for 1160 sequelae of 289 diseases and injuries 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet. 2012 Dec 15;380(9859):2163-96. PMID: 2324560

[2] Global, regional, and national incidence, prevalence, and years lived with disability for 310 diseases and injuries, 1990-2015: a systematic analysis for the Global Burden of Disease Study 2015. GBD 2015 Disease and Injury Incidence and Prevalence Collaborators. Lancet. 2016 Oct 8;388(10053):1545-1602. doi: 10.1016/S0140-6736(16)31678-6.

migration after skin injury because such knowledge might lead to new therapies to promote the healing of chronic skin ulcers. Using high-resolution microscopy, they were able to observe the shape and movement of skin cells as they migrated into a simulated wound, and to link the observations to molecular mechanisms within the cells. As another example, NIAMS investigators who are studying muscle fibers identified a particular protein, called ephrin-A3, that plays a role in regulating how quickly a particular muscle fiber will fatigue. This discovery provides insight into why certain "fast" fibers (which are quick to contract but fatigue relatively quickly) can convert to "slow" fibers (which have more endurance) and why slow fibers are resistant to fiber type switching. It also paves the way for further research to explore how exercise, aging, or disease could affect ephrin-A3 expression.

As researchers uncover the biological pathways that underlie health and disease, we are learning that diseases with varying symptoms may have strikingly similar changes at the molecular level, and this understanding could facilitate the repurposing of existing drugs for new conditions. For example, NIAMS research into the basic biology of the JAK-STAT signaling pathway has led to the development of a new class of drugs, called Jakinibs, for the treatment of rheumatoid arthritis and certain cancers. Researchers now are exploring the safety and efficacy of these drugs to treat other conditions. NIAMS-supported researchers working to develop new treatments for alopecia areata, an autoimmune condition that causes hair loss, demonstrated that inhibiting the JAK-STAT pathway in the skin of mice, using the FDA-approved drugs tofacitinib or ruxolitinib, could induce rapid hair regrowth. Building on these and other findings, a safety and effectiveness clinical trial demonstrated that patients with alopecia who took tofacitinib regrew hair. NIAMS intramural researchers also examined tofacitinib in mice that are predisposed to developing lupus-like symptoms, such as skin inflammation, cardiovascular dysfunction, and kidney disease. They showed the drug could both prevent lupus symptoms from occurring, and improve existing symptoms with treatment. The results suggest that tofacitinib could be either a preventative or therapeutic strategy for control of lupus, and intramural researchers are planning a clinical trial to test this hypothesis.

NIAMS believes investigator-initiated clinical trials are a key part of efforts to improve the health of patients with rheumatic, musculoskeletal, and skin diseases. Through a suite of grant opportunities, NIAMS identifies and funds clinical trials that are as timely and informative as possible, and that will lead to improvements in clinical practices for disease prevention, diagnosis, and treatment.

A large proportion of Americans will experience at least one of the conditions within the NIAMS portfolio at some point in their lifetime. However, in many cases, there is a lack of clear evidence to advise medical professionals in prescribing a certain medication versus another. For example, elderly individuals with knee osteoarthritis and other chronic medical conditions, such as heart disease and diabetes, often are prescribed acetaminophen, non-steroidal anti-inflammatory drugs (NSAIDs), or opioids to manage pain. NIAMS-supported researchers examined the long-term clinical outcomes and economic costs associated with these common treatments for knee osteoarthritis. The study, published in March 2016, identified that the use of opioids provided less benefit than the use of the NSAID naproxen. This finding will help doctors prioritize treatment choices with their patients. In addition, NIAMS intramural researchers led a comprehensive review to develop treatment recommendations for ankylosing

spondylitis and non-radiographic axial spondyloarthritis, two forms of chronic inflammatory arthritis affecting the spine. The findings were used by the American College of Rheumatologyto provide clinicians with current best-evidence for the treatment of common clinical problems faced by patients with these conditions, and facilitate effective use of health care resources, reduce inappropriate care, and minimize geographic variations in care.

NIAMS is committed strongly to enhancing stewardship of our Nation's talent and financial resources, in particular by supporting the next generation of researchers and welcoming innovative ideas. There are several vulnerable periods for promising researchers as they transition from scientific training to fully-independent research careers. NIAMS has implemented a number of programs to support investigators during these often challenging transitions. For example, NIAMS provides mentored clinician scientist awardees with an orientation webinar during their first year, and an in-person forum during their third year to educate them about issues they may face when transitioning to independence, and to learn about the challenges they face in today's research environment. In addition, NIAMS implemented a new grant mechanism in FY 2017 for these early-stage clinician scientists that will support short-term research projects, allowing them to generate preliminary data to support a subsequent application on which they can launch a career. NIAMS is continuing to pilot programs that encourage scientists at various career stages to pursue unusual observations and investigate creative hypotheses that could potentially change paradigms and the practice of biomedical research. The NIAMS Supplements to Advance Research (STAR), Research Innovation for Scientific Knowledge (RISK), and an intramural pilot are described in the Program Portrait below.

Portrait of a Program: NIAMS Encourages Innovative Research

FY 2017 level: $4.000 million
FY 2018 level: $3.835 million
Change: -$ 0.165 million

Biomedical researchers are driven by imagination, curiosity, and the excitement that comes with every new insight into how organisms function or new strategy that improves people's lives. These findings build upon one another, expanding the knowledge base from which future studies emerge. Every so often, a particularly innovative set of experiments dramatically changes how we conduct research, interpret results, care for patients, or prevent disease.

NIAMS is developing new ways to support investigators as they pursue such ambitious, paradigm-shifting ideas. The first of these programs, the NIAMS Supplements to Advance Research (STAR) from Projects to Programs, was launched in FY 2015. STAR provides additional funds to researchers who recently have renewed their first independent NIAMS award (i.e., early-established investigators) so they have freedom to explore some of their related, but higher-risk ideas on which they might build their careers. The first two years of the program yielded eight awards; NIAMS continues to accept applications for FY 2017 and FY 2018 funding.

In FY 2017, NIAMS intends to begin funding a second program for scientists at all career stages. The NIAMS Research Innovation for Scientific Knowledge (RISK) initiatives encourage investigators to pursue unusual observations, test imaginative hypotheses, explore creative concepts, and discover ground-breaking paradigms within the NIAMS mission. Successful applicants will receive two or three years of support to test their bold ideas that challenge prevailing theories or practices.

The NIAMS Intramural Research Program (IRP) also is implementing a pilot program to enhance support for investigators to address challenging, novel research questions using innovative approaches. The Flex Fund program began in FY 2017 and is designed to foster research collaborations either among NIAMS labs or between a NIAMS

investigator and an intramural investigator from another Institute. Projects will explore a research question beyond the current lab focus. Both early-career stage investigators and more senior, tenured investigators are able to apply for the merit-based awards. The Flex Fund award can be used to support the integration of new technologies, or for short-term staff to incorporate new expertise within the group.

Overall Budget Policy: The FY 2018 President's Budget request is $417.898 million a decrease of $139.953 million compared with the FY 2017 Annualized CR level. These reductions are distributed across all programmatic areas and basic, epidemiology, or clinical research.

Program Descriptions and Accomplishments

Arthritis and Rheumatic Diseases: This program advances high-quality basic, translational, and clinical biomedical and biopsychosocial research to treat, cure, and prevent arthritis and autoimmune diseases. It supports the application of new insights in the fields of genetics, genomics, proteomics, immunology, and imaging to understand how the immune system interacts with various tissues in normal and pathological conditions, and to ensure a continuous supply of new targets on which therapies can be based. One current focus of NIAMS-funded research on rheumatoid arthritis and lupus is identifying molecular signatures that may facilitate personalized therapies. For example, an analysis using cutting-edge approaches that identify changes in how DNA is expressed revealed differences between the molecular patterns seen in the hip and knee joints of rheumatoid arthritis patients. The findings help to explain why some joints improve, while others do not, in response to the same drug treatment. Ultimately, the discovery may improve treatment by enabling new and existing therapies to be tailored based on joint-specific biological findings. In lupus, a heterogeneous disease with complex and variable clinical manifestations, the inability to group patients into clear-cut categories has been a major barrier to diagnosis and treatment, and has limited the success of clinical trials. Researchers seeking to address this issue recently identified differences in gene expression among pediatric patients with lupus. The differences correlate with changes in disease activity and can be used to stratify patients into distinct groups. The ability to classify patients in a clinically meaningful way based on molecular information is an important step toward the goal of developing precision medicine approaches to drug discovery and treatment for lupus.

Musculoskeletal Biology and Diseases: This program focuses on understanding the fundamental biology of tissues that constitute the musculoskeletal system and on translating this knowledge to a variety of diseases and conditions. The portfolio covers research into causes and treatments for chronic back and neck pain, prevention and repair strategies for joint injuries or joint diseases, and the development and application of imaging tools for assessing bone quality or monitoring osteoarthritis progression. For example, a team of scientists recently analyzed magnetic resonance images, collected through a decade-long public-private partnership known as the Osteoarthritis Initiative, and detected structural changes throughout the knee joint that precede signs of osteoarthritis seen on x-rays. The study also showed that patients with more imaging abnormalities were at increased risk of later developing radiographic osteoarthritis. These findings call into question the long-held assumption that damage to cartilage is the primary cause of osteoarthritis, provides insights into the mechanisms leading to joint deterioration, and may lead to the identification of therapeutic targets that had not been

considered previously. Strategies to repair or replace cartilage, whether damaged by inflammation or some other trigger, continue to show promise in the laboratory. Researchers are developing combinations of matrices and stem cells that can be implanted into a damaged joint. One group developed a scaffold that can guide stem cells derived from fat into cartilage-producing cells and, in a recent publication, demonstrated that the material can be modified to regulate the amount of an anti-inflammatory protein that the new cells produce. Another group is developing scaffolds that can deliver nutrients to cartilage-producing cells once they are implanted. Because natural cartilage lacks a blood supply, earlier methods could make only a limited amount of cartilage and were not suitable for repairing the centimeter-sized defects that can occur in human joints. This new work overcomes that challenge in a cost-effective way, making another important advance toward commercializing cartilage repair approaches for use in patients if demonstrated to be safe and effective.

Bone Biology and Diseases: This program supports a variety of projects ranging from fundamental research into the genetic and cellular mechanisms involved in the build-up and breakdown of bone in health and disease, to epidemiologic studies of lifestyle factors that can preserve bone health. Many investigators are exploring the molecular processes that regulate bone formation, bone resorption, and mineralization, including the effects of hormones, growth factors, and other signals on bone cells. Additional teams are pursuing clinical work that may lead to new or improved approaches to identify people who are at risk of bone diseases, or to treat patients who have a bone disease. Osteoporosis is the most common disease in this portfolio, while others, such as fibrodysplasia ossificans progressiva (FOP; a disease characterized by extra bone formation outside of the skeleton in muscles, tendons, and ligaments), are extremely rare. Recently, NIAMS-funded investigators identified drug candidates targeting two different mechanisms that contribute to FOP's debilitating and life-threatening symptoms. One compound is already being tested in an industry-funded phase 2 clinical trial, and understanding how it interferes with bone formation represents a promising step in establishing an effective treatment strategy for people with FOP. Another example of how fundamental research can influence clinical care comes from researchers studying hyperparathyroidism, a hormonal condition that affects calcium levels in the body and leads to health problems such as fragile bones, kidney stones, and digestive symptoms. A combination of observations in people and experiments in mice have uncovered one of the molecular underpinnings of bone loss associated with the disease and suggest that treating patients with existing drugs may sidestep the need for surgical removal of a patient's parathyroid glands.

Muscle Biology and Diseases: This program covers basic, translational, and clinical research projects in skeletal muscle biology and diseases. It includes studies of the fundamental biology of muscle development, muscle function and repair, and the development of imaging tools to monitor these processes. Its overarching objective is to explain muscle's role in health and, ultimately, to treat or prevent skeletal muscle diseases and disorders such as inflammatory myopathies, muscle ion channel diseases, disuse atrophy, skeletal muscle injury, and loss of muscle mass and strength associated with aging and diseases. NIAMS-supported investigators are testing whether basic research advances in CRISPR-based technology, which allows precise targeting and excision of specific genetic sequences, can be leveraged for new gene therapy treatments to correct the genetic defects underlying two of the most common muscular dystrophies. One group recently described an approach that, if adapted for humans and proven safe and effective, might be a treatment for facioscapulohumeral muscular dystrophy. Another is

developing a related technique that theoretically could benefit up to 60 percent of the people who have Duchenne muscular dystrophy (DMD). Although these and other CRISPR-based interventions need many more years of study before clinical trials can begin, other potential therapies already have been tested in DMD patients. During such studies, investigators noticed that participants lost their ability to walk at a range of ages, regardless of whether they received an intervention or a placebo. Because rigorous clinical trials depend on comparing similar groups of people, researchers needed a way to distinguish between patients who quickly lose their ability to walk and those whose disease progresses more slowly. Analysis of data from a natural history study begun a decade ago revealed that changes in DMD symptoms vary with the type of disease-causing mutation. These findings are immediately relevant to patients and their caregivers, as well as to the researchers who will be designing future clinical trials.

Skin Biology and Diseases: This program's support for basic, translational, and clinical research includes work on the developmental and molecular biology of skin, the skin as an immune organ, and the genetics of skin diseases. For example, basic researchers are investigating the characteristics of the millions of microbes that inhabit the skin, collectively referred to as the skin microbiome. They have found that while it is quite stable over time, the composition of microbial communities vary between different regions of the skin. The findings provide a foundation for future research to determine whether the microbiome is altered in various skin diseases. Translational research on the skin's sensory functions has identified a molecule that plays an important role in itch sensation. This discovery may help individuals who suffer from chronic itch caused by certain medications and many skin diseases, such as psoriasis and eczema. Other translational research is harnessing the power of the immune system to treat pemphigus, an autoimmune blistering skin disease. Researchers showed in mice that the new approach could selectively remove B cells that make the autoantibodies that cause pemphigus, while sparing non-pathogenic B cells that protect against infections and cancer. Although more work is needed before the approach can be tested in humans, the results offer promise for safer and more effective treatment of pemphigus and some other autoimmune conditions.

Portrait of a Program: Core Centers Foster Clinical and Preclinical Arthritis and Musculoskeletal and Skin Diseases Research

FY 2017 level: $18.082 million
FY 2018 level: $15.420 million
Change: -$ 2.662 million

NIAMS-funded core facilities provide arthritis and musculoskeletal and skin disease researchers with access to instruments, technologies, expert consultation, and other services. In response to recommendations from an FY 2013 Institute-led Centers Evaluation Working Group (CEWG) report, NIAMS changed how cores supported through its Resource-based Centers program are organized. Consistent with the CEWG's recommendation that NIAMS allow flexibility and dynamism in the design, structure, and conduct of all of its Centers, the new Resource-based Centers (beginning in FY 2016) can serve investigators who have diverse research interests but need similar services, or they can have a more traditional, narrow disease or biological focus or theme. Centers can provide a highly specialized resource, such as a well-defined patient cohort with associated clinical data and biospecimens, or they can offer technologies and services, such as advanced imaging or single cell analysis. The Institute removed the requirement that Centers offer two research cores and, instead, is allowing them to focus their resources into a single service. Moreover, a Center can be geographically dispersed to promote access to resources on a national scale.

NIAMS also is changing its Multidisciplinary Clinical Research Centers (MCRC) program, which was established in 2001 to foster the design of clinical studies, perform statistical analyses, and contribute to ground-breaking

clinical research in arthritis, musculoskeletal, and skin research. During its review, the CEWG concluded that areas of study supported by the MCRCs were thriving and in less need of a direct stimulus. The CEWG also noted that the MCRCs' Methodology Cores still contribute greatly to the design of sophisticated studies and analytic approaches and are important for fostering collaborations among clinical and epidemiological researchers. To preserve these elements, NIAMS reformulated the MCRC program to focus solely on providing core resources that investigators can leverage when applying for independent funding from NIAMS.

Intramural Research Program (IRP): NIAMS' IRP conducts innovative basic, translational, and clinical research relevant to the NIAMS mission and trains investigators who are interested in related research careers. Its basic and physician scientists study the genetics, etiology, pathogenesis, and treatment of rheumatic, autoimmune, inflammatory, bone, skin, and muscle diseases. NIAMS intramural researchers are utilizing powerful genomic techniques to better understand how the two arms of our immune system – innate and adaptive – respond to infection. They discovered that certain innate immune cells are primed at the DNA level for rapid response to invaders, while adaptive immune cells need to modify their DNA prior to responding to pathogens. Interestingly, once activated, both cell types' DNA structure was similar, and they control key responses to infection in similar ways. In addition, over the past two decades, NIAMS intramural researchers have worked to identify the genetic causes of various autoinflammatory disorders. These diverse diseases are caused by abnormal activation of the immune system and are characterized by episodes of inflammation that result in symptoms such as fever, rash, or joint swelling. Recently, a common signaling pathway was found to be altered in several seemingly disparate conditions. This discovery paves the way for the development of new therapeutic interventions for these and other inflammatory conditions.

Portrait of a Program: Intramural Collaborations with Extramural Clinical Networks

NIAMS intramural researchers increasingly are developing innovative new partnerships with clinical networks in the extramural community to facilitate scientific discovery. In order to uncover the molecular basis of genetically-complex diseases, genome-wide association studies often are undertaken. However, for rare diseases, such as systemic juvenile idiopathic arthritis (sJIA), researchers at a single institution often are unable to assemble a large enough patient cohort to be able to distinguish genetic factors that contribute to disease. In order to overcome this challenge, NIAMS intramural researchers led a collaboration with the International Childhood Arthritis Genetics consortium (INCHARGE), a network of investigators from major pediatric rheumatology centers in North America, South America, and Europe. Through the partnership, the researchers and clinicians were able to assemble the largest genomic study of sJIA to date, with a dataset representing nearly 1,000 children with sJIA and over 7,000 healthy age-matched control subjects. Analysis of the dataset is revealing new insights into the pathophysiology of sJIA, and has identified several unique genetic signatures that increase risk of developing the condition.

In addition to assembling large cohorts from disparate external researchers, there is also a role for the intramural program to develop protocols which can be dispersed among the research community. For example, in FY 2015 the NIAMS Vasculitis Translational Research Program (VTRP) was created as a complement to an existing collaborative network of researchers in vasculitis including the extramural Vasculitis Clinical Research Consortium (VCRC), local referring physicians in the DC-metro area, and the Vasculitis Foundation, the major patient advocacy group for vasculitis in North America. The VTRP is developing novel molecular imaging protocols that take advantage of the state-of-the-art radiology and nuclear medicine departments within the NIH Clinical Center to discover new biomarkers of vasculitis disease activity. The intramural environment serves as an incubator, allowing faster assembly of patient cohorts and rapid access to novel technologies to test and validate the new approaches. Once standardized, the protocols can be disseminated throughout the VCRC extramural network, leading to enhanced patient care.

Research Management and Support (RMS): The RMS budget supports the scientific, administrative management, and information technology activities associated with the NIAMS' day-to-day operations. In FY 2016, NIAMS managed more than 1,187 research grants and centers, as well as 39 research and development contracts and 294 individual and institutional full-time research training positions. NIAMS supported 556 clinical research studies, including 65 clinical trials. A key component of the NIAMS mission is to effectively communicate with the public. As part of that effort, NIAMS disseminates information about its research advances and health information on several social media channels. Posts provide information in both English and Spanish that describe the impact of NIAMS-supported research and trans-NIH efforts on health conditions within the NIAMS mission. The NIAMS image gallery showcases scientific images created by both intramural and extramural researchers, giving viewers a powerful, often beautiful, visualization of the science. Likewise, the NIAMS YouTube channel is a means for scientists to share the results of their work and their enthusiasm for the discoveries they are making.

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

Detail of Full-Time Equivalent Employment (FTE)

OFFICE/DIVISION	FY 2016 Final			FY 2017 Annualized CR			FY 2018 President's Budget		
	Civilian	Military	Total	Civilian	Military	Total	Civilian	Military	Total
Intramural Research Program									
Total:	129	1	130	129	1	130	129	1	130
Office of Extramural Activities									
Total:	48	-	48	48	-	48	48	-	48
Office of the Director									
Total:	49	-	49	49	-	49	49	-	49
Office of Extramural Activities									
Reimbursable:	-	-	-	-	-	-	-	-	-
Office of the Director									
Direct:	49	-	49	49	-	49	49	-	49
Reimbursable:	-	-	-	-	-	-	-	-	-
Office of Extramural Activities									
Direct:	48	-	48	48	-	48	48	-	48
Intramural Research Program									
Direct:	123	1	124	123	1	124	123	1	124
Reimbursable:	6	-	6	6	-	6	6	-	6
Total	226	1	227	226	1	227	226	1	227
Includes FTEs whose payroll obligations are supported by the NIH Common Fund.									
FTEs supported by funds from Cooperative Research and Development Agreements.	0	0	0	0	0	0	0	0	0

FISCAL YEAR	Average GS Grade
2014	12.1
2015	12.5
2016	12.4
2017	12.4
2018	12.4

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

Detail of Positions[1]

GRADE	FY 2016 Final	FY 2017 Annualized CR	FY 2018 President's Budget
Total, ES Positions	1	1	0
Total, ES Salary	185,100	185,489	185,694
GM/GS-15	18	18	18
GM/GS-14	28	28	28
GM/GS-13	49	49	49
GS-12	20	20	20
GS-11	12	12	12
GS-10	0	0	0
GS-9	7	7	7
GS-8	3	3	3
GS-7	5	5	5
GS-6	4	4	4
GS-5	0	0	0
GS-4	0	0	0
GS-3	1	1	1
GS-2	0	0	0
GS-1	0	0	0
Subtotal	147	147	147
Grades established by Act of July 1, 1944 (42 U.S.C. 207)	0	0	0
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	98	98	98
Total permanent positions	147	147	147
Total positions, end of year	244	244	244
Total full-time equivalent (FTE) employment, end of year	227	227	227
Average ES salary	185,100	185,489	185,694
Average GM/GS grade	12.4	12.4	12.4
Average GM/GS salary	103,126	103,151	103,415

[1] Includes FTEs whose payroll obligations are supported by the NIH Common Fund.