DEPARTMENT OF HEALTH AND HUMAN SERVICES

NATIONAL INSTITUTES OF HEALTH

Common Fund (CF)

FY 2016 Budget | Page No.

NATIONAL INSTITUTES OF HEALTH
Common Fund
Budget Mechanism - Total[1]

(Dollars in Thousands)

MECHANISM	FY 2014 Actual		FY 2015 Enacted		FY 2016 President's Budget		FY 2016 +/- FY 2015	
	No.	Amount	No.	Amount	No.	Amount	No.	Amount
Research Projects:								
Noncompeting	225	$139,096	272	$165,502	278	$178,342	6	$12,840
Administrative Supplements	*(86)*	19,278	*(89)*	20,000	*(64)*	14,367	*(-25)*	-5,633
Competing:								
Renewal	0	0	0	0	0	0	0	0
New	149	161,477	166	171,830	159	161,293	-7	-10,537
Supplements	7	2,633	0	0	0	0	0	0
Subtotal, Competing	156	$164,109	166	$171,830	159	$161,293	-7	-$10,537
Subtotal, RPGs	381	$322,483	438	$357,332	437	$354,002	-1	-$3,330
SBIR/STTR	0	0	0	0	0	0	0	0
Research Project Grants	381	$322,483	438	$357,332	437	$354,002	-1	-$3,330
Research Centers:								
Specialized/Comprehensive	31	$51,892	34	$54,465	32	$47,901	-2	-$6,564
Clinical Research	10	17,407	10	22,656	10	18,484	0	-4,172
Biotechnology	1	3,389	3	2,665	3	2,651	0	-14
Comparative Medicine	3	8,005	3	6,249	0	0	-3	-6,249
Research Centers in Minority Institutions	0	0	0	0	0	0	0	0
Research Centers	45	$80,693	50	$86,035	45	$69,036	-5	-$16,999
Other Research:								
Research Careers	16	$2,249	27	$4,240	25	$4,237	-2	-$3
Cancer Education	0	0	0	0	0	0	0	0
Cooperative Clinical Research	0	0	0	0	0	0	0	0
Biomedical Research Support	0	0	0	0	0	0	0	0
Minority Biomedical Research Support	0	0	0	0	0	0	0	0
Other	58	43,397	55	36,482	105	65,930	50	29,448
Other Research	74	$45,645	82	$40,722	130	$70,167	48	$29,445
Total Research Grants	500	$448,822	570	$484,089	612	$493,205	42	$9,116
Ruth L Kirchstein Training Awards:	FTTPs		FTTPs		FTTPs		FTTPs	
Individual Awards	0	$0	0	$0	0	$0	0	$0
Institutional Awards	0	3,834	0	15,497	0	26,381	0	10,884
Total Research Training	0	$3,834	0	$15,497	0	$26,381	0	$10,884
Research & Develop. Contracts	0	$43,728	0	$11,697	0	$11,697	0	$0
(SBIR/STTR) (non-add)	*(0)*	*(0)*	*(0)*	*(0)*	*(0)*	*(0)*	*(0)*	*(0)*
Intramural Research	0	20,624	0	18,155	0	18,155	0	0
Res. Management & Support	0	14,167	0	16,201	0	16,201	0	0
Res. Management & Support (SBIR Admin) (non-add)	*(0)*	*(0)*	*(0)*	*(0)*	*(0)*	*(0)*	*(0)*	*(0)*
Construction		0		0		0		0
Buildings and Facilities		0		0		0		0
Total, Common Fund	0	$531,174	0	$545,639	0	$565,639	0	$20,000

[1] All items in italics and brackets are non-add entries.

Major Changes in the Fiscal Year 2016 President's Budget Request

Major changes by budget mechanism and/or budget activity detail are briefly described below. Note that there may be overlap between budget mechanisms and activity detail and these highlights will not sum to the total change for the FY 2016 President's Budget for the Common Fund, which is $20.000 million more than the FY 2015 Enacted level, for a total of $565.639 million.

Research Project Grants (-$3.330 million; total $354.002 million): The Common Fund expects to support a total of 437 Research Project Grant (RPG) awards in FY 2016. Noncompeting RPGs will increase by 6 awards and $12.840 million. New RPGs will be awarded in Common Fund programs to be launched in FY 2016 as well as in new initiatives within ongoing Common Fund programs.

Research Centers (-$16.999 million; total $69.036 million): The Common Fund plans to support a total of 45 Research Center Awards in FY 2016. The decrease in support is due to the completion of the first phase of support for initiatives within the Protein Capture, Illuminating the Druggable Genome, and Knockout Mouse Phenotyping programs. Assessments of these programs will determine whether a second phase of support is warranted.

Other Research (+$29.445 million; total $70.167 million): The estimated increase in Common Fund support for the Other Research mechanism includes a request to use $30 million in Other Transaction Authority (OTA). OTA funds will be used to support programs and activities that aim to achieve rapid technology development. One anticipated use for OTA funds in FY 2016 is a planned ramping up of the Stimulating Peripheral Activity to Relieve Conditions (SPARC) program, a high risk, goal-driven endeavor to develop novel therapies based on neuromodulation of organ function.

Research Training (+$10.884 million; total $26.381 million): The Common Fund plans to support $26.381 million in institutional training awards in FY 2016. The increase in support is due to increases in training activities within the Big Data to Knowledge program, and the inclusion of additional trainees within the Building Infrastructure Leading to Diversity (BUILD) initiative, part of the Enhancing the Diversity of the NIH-Funded Workforce program.

National Institutes of Health
Common Fund by Initiative
(Dollars in Thousands)

(Dollars in Thousands)	FY 2014 Actual	FY 2015 Enacted	FY 2016 President's Budget	FY 2016 +/- FY 2015
4D Nucleome				
Technology Development, Biological Validation, Modeling and Pilot Mapping	0	10,038	10,038	0
Nucleomic, Imaging, and Computational Tool Development	0	10,068	10,068	0
4D Nucleome Coordination and Integration	0	4,665	7,842	3,177
Subtotal, 4D Nucleome	0	24,771	27,948	3,177
Big Data to Knowledge (BD2K)				
Big Data to Knowledge (BD2K)	8,594	43,466	62,961	19,495
Enhancing the Diversity of the NIH-Funded Workforce				
BUILD Initiative	27,622	44,699	47,524	2,825
National Research Mentoring Network (NRMN)	2,542	1,977	2,158	181
Coordination and Evaluation Center (CEC)	2,326	2,021	1,465	(556)
Subtotal, Enhancing the Diversity of the NIH-Funded Workforce	32,490	48,697	51,147	2,450
Epigenomics				
Mapping Centers	1,102	22	0	(22)
Human Health and Disease	3,511	2,960	0	(2,960)
Technology Development in Epigenetics	4,347	0	0	0
Pharmacology	3,894	4,018	4,000	(18)
Subtotal, Epigenomics	12,854	7,000	4,000	(3,000)
Genotype-Tissue Expression (GTEx) Resources				
Genotype-Tissue Expression (GTEx) Resources	54,280	11,078	4,114	(6,964)
Global Health				
Medical Education Partnership Initiative (MEPI)	3,000	3,000	3,000	0
Human Heredity and Health in Africa (H3Africa)	11,845	9,102	8,443	(659)
Subtotal, Global Health	14,845	12,102	11,443	(659)
Glycoscience				
Accelerating Translation of Glycoscience: Integration and Accessibility	0	9,362	19,862	10,500
High-Risk Research				
NIH Director's Pioneer Award	26,123	22,546	10,877	(11,669)
NIH Director's New Innovator Award Program	106,262	88,648	80,300	(8,348)
Transformative R01's	52,710	50,633	39,432	(11,201)
NIH Director's Early Independence Award Program	18,574	19,244	19,216	(28)
Subtotal, High-Risk Research	203,669	181,071	149,825	(31,246)
Human Microbiome				
Sequence a Reference Set of Genomes	1,968	0	0	0
Evaluation of multi-'omic data in understanding the microbiome's role in health and disease	8,603	6,711	1,833	(4,878)
Subtotal, Human Microbiome	10,571	6,711	1,833	(4,878)
Illuminating the Druggable Genome				
Knowledge Management Network	2,900	3,329	0	(3,329)
Technology Development	2,642	2,659	2,588	(71)
Subtotal, Illuminating the Druggable Genome	5,542	5,988	2,588	(3,400)

National Institutes of Health
Common Fund by Initiative
(Dollars in Thousands)

(Dollars in Thousands)	FY 2014 Actual	FY 2015 Enacted	FY 2016 President's Budget	FY 2016 +/- FY 2015
Knockout Mouse Phenotyping Program				
Production, Characterization, and Cryopreservation	8,467	6,711	0	(6,711)
Phenotyping and Data Release	7,958	6,501	0	(6,501)
Data Coordination	638	526	0	(526)
Subtotal, Knockout Mouse Phenotyping Program	17,063	13,738	0	(13,738)
NIH Center for Regenerative Medicine (NCRM)				
NIH Center for Regenerative Medicine (NCRM)	983	0	0	0
Cell Therapy Projects	1,548	1,250	1,250	0
Cell-Based Screenings	6,791	6,750	6,750	0
Subtotal, NIH Center for Regenerative Medicine (NCRM)	9,322	8,000	8,000	0
Pediatric Research Program				
Gabriella Miller Kids First Research Act	0	12,600	12,600	0
Science of Behavior Change				
Mechanisms of Change	3,766	0	0	0
Science of Behavior Change 2	0	6,730	5,782	(948)
Subtotal, Science of Behavior Change	3,766	6,730	5,782	(948)
S.P.A.R.C. - Stimulating Peripheral Activity to Relieve Conditions				
Functional and Anatomical Mapping of Five Organ Systems	0	1,055	18,055	17,000
Next Generation Tools	0	2,179	11,179	9,000
Off-Label Use of Existing Market-Approved Technology for Small Markets	0	205	3,205	3,000
Data Coordination	0	79	1,079	1,000
Subtotal, S.P.A.R.C. - Stimulating Peripheral Activity to Relieve Conditions	0	3,518	33,518	30,000
Building Blocks, Biological Pathways and Networks				
National Technology Centers for Networks and Pathways (TCNPs)	110	0	0	0
Extracellular RNA Communication				
Data Management and Resource/Repository (DMRR)	2,492	2,438	2,436	(2)
Reference Profiles of Human Extracellular RNA	4,137	4,578	4,078	(500)
Extracellular RNA Biogenesis, Biodistribution, Uptake, and Effector Function	7,531	7,533	7,177	(356)
Clinical Utility of Extracellular RNAs as Biomarkers and Therapeutic Agents	8,939	14,588	16,132	1,544
Subtotal, Extracellular RNA Communication	23,099	29,137	29,823	686
Gulf Long-term Follow-up of Workers Study				
Gulf Long-term Follow-up of Workers Study	2,500	3,000	0	(3,000)
Health Care Systems Research Collaboratory				
NIH-HMORN Coordinating Center	3,355	2,133	2,116	(17)
Expansion Activities	10,719	10,355	10,642	287
Subtotal, Health Care Systems Research Collaboratory	14,074	12,488	12,758	270
Health Economics				
Changing Incentives for Consumers, Insurers, and Providers	625	554	200	(354)
Science of Structure, Organization, and Practice Design in the Efficient Delivery of Healthcare	3,943	4,419	3,871	(548)
Economics of Prevention	3,787	3,283	2,816	(467)
Data Infrastructure to Enable Research on Health Reform	495	79	431	352
Subtotal, Health Economics	8,850	8,335	7,318	(1,017)
Library of Integrated Network-Based Cellular Signatures (LINCS)				
Perturbation-Induced Data and Signature Generation Centers (U54)	10,199	11,080	10,000	(1,080)

National Institutes of Health
Common Fund by Initiative
(Dollars in Thousands)

(Dollars in Thousands)	FY 2014 Actual	FY 2015 Enacted	FY 2016 President's Budget	FY 2016 +/- FY 2015
Metabolomics				
Comprehensive Metabolomics Research Cores	12,725	10,969	9,935	(1,034)
Interdisciplinary Training in Metabolomics	5,281	3,553	3,554	1
Metabolomics Technology Development	2,632	2,503	1,888	(615)
Metabolomics Reference Standards Synthesis	1,872	1,926	1,967	41
Metabolomics Data Sharing and Program Coordination Core	1,540	1,913	2,221	308
Subtotal, Metabolomics	24,050	20,864	19,565	(1,299)
Molecular Libraries and Imaging				
Creation of NIH Bioactive Small Molecule Library & Screening Centers	573	0	0	0
Nanomedicine				
Nanomedicine Development Centers	12,000	180	0	(180)
Protein Capture				
Antigen Production	1,932	0	0	0
Production of anti-TF antibodies	3,090	3,453	0	(3,453)
New Reagent Technology Development and Piloting	486	125	0	(125)
Subtotal, Protein Capture	5,508	3,578	0	(3,578)
Re-engineering the Clinical Research Enterprise				
Dynamic Assessment of Patient-Reported Chronic Disease Outcomes	298	0	0	0
Enhance Clinical Research Training via the National Multi-disciplinary CR Career Development Program and CRTP and MSTP Expansions	1,100	0	0	0
Subtotal, Re-engineering the Clinical Research Enterprise	1,398	0	0	0
Regulatory Science				
Microphysiological Systems for Drug Efficacy and Toxicity Testing	4,931	4,000	4,000	0
Structural Biology				
Membrane Protein Production	9	0	0	0
Single Cell Analysis				
Pilot Studies to Evaluate Cellular Heterogeneity	7,538	6,221	6,003	(218)
Exceptionally Innovative Tools and Technologies for Single Cell Analysis	4,691	4,535	2,939	(1,596)
Accelerating the Integration and Translation of Technologies to Characterize Biological Processes at the Single Cell Level	8,317	7,503	5,398	(2,105)
Single Cell Analysis Challenges	823	95	100	5
Subtotal, Single Cell Analysis	21,369	18,354	14,440	(3,914)
Undiagnosed Disease Program				
Undiagnosed Diseases Program Network	18,690	28,800	29,900	1,100
Training in the Use of Contemporary Genomic Approaches to Rare Disease Diagnostics	935	900	900	0
Subtotal, Undiagnosed Disease Program	19,625	29,700	30,800	1,100
Strengthening the Biomedical Research Workforce				
Director’s Workforce Innovation Award to Enhance Biomedical Research Training	6,542	6,750	6,750	0
Strategic Planning Funds	3,341	3,341	3,341	0
Subtotal Common Fund	531,174	545,639	534,416	(11,223)
New Initiatives in Common Fund	0	0	31,223	31,223
Total Common Fund	531,174	545,639	565,639	20,000

Justification of Budget Request

Common Fund

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

Budget Authority (BA):

	FY 2014 Actual	FY 2015 Enacted	FY 2016 President's Budget	FY 2016 + /- FY 2015
BA	$531,174,000	$545,639,000	$565,639,000	$20,000,000
FTE	0	0	0	0

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

Overview

The NIH Common Fund supports research in areas of emerging scientific opportunities, rising public health challenges, and knowledge gaps that deserve special emphasis; that would benefit from strategic coordination and planning across the NIH ICs; and that are designed to address specific, high-impact goals and milestones within a 5 to 10 year timeframe. Collectively, Common Fund programs represent strategic investments aimed at solving problems or building resources to catalyze research throughout the entire biomedical research enterprise. Many Common Fund program support the NIH Director's priority themes for FY 2016:

1. Unraveling Life's Mysteries through Basic Research
2. Translating Discovery into Health
3. Harnessing Data and Technology to Improve Health
4. Preparing a Diverse and Talented Biomedical Research Workforce

Significant efforts are being made to evaluate Common Fund programs during their lifetime and outcomes are assessed as programs end. Funds freed as the programs end or move to other sources of support will be available in FY 2016 for new challenges and opportunities. Strategic planning is therefore a substantial activity as NIH works with stakeholders to identify new NIH-wide priorities for the Common Fund.

Overall Budget Policy: The FY 2016 President's Budget Request for the Common Fund is $565.639 million, an increase of $20.000 million, or 3.7 percent above the FY 2015 Enacted level. The Common Fund will continue to support high priority research with trans-NIH relevance in FY 2016. As mature programs transition out of the Common Fund, new programs are being established through strategic planning activities that identify potentially transformative areas of research where limited-term Common Fund investment can have a catalytic impact.

Selected Program Descriptions and Accomplishments

The Common Fund supports approximately 30 programs, most of which consist of a series of integrated initiatives that collectively address a set of goals that aim to transform the way research is conducted, the way that health and disease are understood, and/or the way that diseases are diagnosed or treated. These programs span a wide range of biomedical research fields, and encompass both basic and translational research. The Common Fund highlights here programs that exemplify the science to be supported in FY 2016 and that involve budget shifts of $3 million or more compared to FY 2015. Also included are Common Fund programs that will be supported in a second phase to address additional scientific challenges and emerging opportunities.

Program Portrait: 4D Nucleome

FY 2015 Level: $ 24.771 million
FY 2016 Level: $ 27.948 million
Change: +$3.177 million

It is estimated that each human cell contains approximately 2 meters (6.5 feet) of linear DNA, squeezed inside the cell's microscopic nucleus. We now know that DNA is not randomly arranged within the nucleus; instead, the organization of the nucleus is tightly controlled and early information suggests that this organization plays a role in cell function. However, specific consequences of this organization are not well understood. The Common Fund's 4D (four dimensional) Nucleome program (http://commonfund.nih.gov/4Dnucleome/index) aims to understand principles underlying nuclear organization in space (three dimensions) and time (the fourth dimension), the role nuclear organization plays in gene expression and cellular function, and how changes in nuclear organization affect normal development as well as various diseases. This program will develop technologies, resources, and data to enable the study of the 4D Nucleome, including novel tools to explore the dynamic nuclear architecture and its role in gene expression programs, models to examine the relationship between nuclear organization and function in both normal development and disease, and reference maps of nuclear architecture in a variety of cells and tissues. In FY 2016, the 4D Nucleome program will expand to include a pool of Opportunity Funds that will be used to support new projects and initiatives addressing identified needs arising throughout the lifetime of the program.

Big Data to Knowledge (BD2K)

As biomedical tools and technologies rapidly improve, researchers are producing and analyzing an ever-expanding amount of complex biological data called "big data." As one component of an NIH-wide strategy, the Common Fund, in concert with the NIH ICs, is supporting the Big Data to Knowledge (BD2K) program (http://commonfund.nih.gov/bd2k/), which aims to facilitate broad use of biomedical big data, develop and disseminate analysis methods and software, enhance training in techniques associated with big data usage, and establish a network of collaborating centers of excellence. The expectation is that implementation of BD2K will result in sweeping cultural changes in the way the biomedical research community shares, accesses, queries, cites, and analyzes data.

In FY 2016, it is anticipated that BD2K will be running at full capacity with coordinated efforts underway and the biomedical community engaged with NIH in increasing the accessibility and reuse of biomedical big data and the training of data scientists.

Budget Policy: The FY 2016 President's Budget Request is $62.961 million for the BD2K program from the Common Fund, an increase of $19.495 million or 44.9 percent above the FY 2015 Enacted level. This estimated increase in funding will be used to support activities described above, including increases in the Centers of Excellence for Biomedical Big Data and enhanced efforts in training and data coordination.

Enhancing the Diversity of the NIH-Funded Workforce

NIH has long recognized that diversity in the biomedical and behavioral research workforce is critical to ensuring that the brightest and most creative minds are contributing to scientific and technological advancements. However, demographic data demonstrating persistent underrepresentation of certain groups and recent research findings have suggested that additional investments using different approaches are needed. In particular, the powerful impact that psychosocial factors play in encouraging or deterring the pursuit of science careers, especially among groups traditionally underrepresented in science fields, and has been demonstrated. Importantly, effectiveness of interventions targeting psychosocial factors in promoting persistence in the sciences has also been demonstrated. The Enhancing the Diversity of the NIH-Funded Workforce program (http://commonfund.nih.gov/diversity) aims to scale these recent approaches and integrate them with rigourous biomedical research training to develop and test unique innovative interventions to transform the culture and effectiveness of research training and mentoring.

This program consists of three highly integrated initiatives. The Building Infrastructure Leading to Diversity (BUILD) initiative is a set of experimental training awards designed to implement and assess interventions at the institutional, social, and individual levels aiming to attract students from diverse backgrounds into the training pipeline and to encourage their persistence to become future NIH-supported researchers. The National Research Mentoring Network (NRMN) is developing novel mentoring strategies, establishing standards and training for mentors, and developing a diverse network of mentors and mentees across the country. The Coordination and Evaluation Center (CEC) is working across all initiatives and awardee institutions to examine which interventions are most effective and within what contexts, and is responsible for disseminating lessons learned to the broad biomedical research training community, thus ultimately strengthening the entire biomedical research enterprise.

In FY 2016, the BUILD initiative budget will expand to incorporate additional trainees within existing awards.

Budget Policy: The FY 2016 President's Budget Request is $51.147 million for the Enhancing the Diversity of the NIH-Funded Workforce program from the Common Fund, an increase of $2.450 million, or 5.0 percent above the FY 2015 Enacted level. The estimated increase in funding will be used to support additional trainees within the BUILD initiative.

Epigenomics
Epigenomics is the field of biomedical research focused on DNA modifications and modifications of proteins associated with DNA. These modifications, collectively called the "epigenome," occur "on top of" the linear DNA that makes up the genome and can be associated with changes in gene activity without altering the underlying DNA sequence. The Common Fund's Epigenomics program (http://commonfund.nih.gov/epigenomics/) is developing resources, tools, and technologies to enable investigations of the role of epigenomic modifications in human health and disease. The Epigenomics program has generated almost 90 reference maps of epigenomic modifications in healthy human cells and tissues, as well as numerous resources and tools that are being disseminated to and used by the biomedical research community. Researchers in the Epigenomics program have also published landmark studies on the role of epigenomic modifications in normal development and disease and are developing novel approaches to analyze the data in the context of different diseases.

In FY 2016, the Epigenomics program undergoes a planned decrease as awards to undertake computational analyses using the publicly available epigenomic reference maps are completed.

Budget Policy: The FY 2016 President's Budget Request is $4.000 million for the Epigenomics program, a decrease of $3.000 million, or 42.9 percent below the FY 2015 Enacted level. This decrease reflects the planned completion of the Computational Analyses Exploiting Reference Epigenomic Maps activity within the Human Health and Disease initiative.

Genotype-Tissue Expression
Some diseases result from sequence variation within the protein-coding region of specific genes; however, many diseases involve changes in DNA sequences that lie outside of any protein-coding region, making it difficult to determine how the change leads to disease. The Genotype-Tissue Expression (GTEx) program (http://commonfund.nih.gov/GTEx/) provides data on how human DNA variation correlates with variation in gene expression levels, uncovering valuable insights into the mechanisms of gene regulation and how perturbations in gene expression may be related to various diseases. The GTEx program has been highly successful in procuring samples, extracting high quality RNA from tissues, and obtaining data from gene expression array and RNA sequencing experiments. Additionally, a number of Standard Operating Procedures and best practices for specimen collection are in place and available for use by the biomedical research community. Data and biospecimens are being made available to the research community to support additional molecular analyses of GTEx samples that will add scientific value to the resource as a whole. Data from the GTEx program will strengthen the power of genome-wide association studies to identify potential new gene targets for therapies.

In FY 2016, the GTEx program will undergo a planned decrease as the primary deliverables of the program, including biospecimens, gene variation and expression data, and statistical methods, will be in place.

Budget Policy: The FY 2016 President's Budget Request is $4.114 million for the GTEx program, a decrease of $6.964 million, or 62.9 percent below the FY 2015 Enacted level. The estimated decrease reflects the planned decrease in initiatives for a Laboratory, Data Analysis, and Coordinating Center, statistical methods, and molecular analyses of biospecimens.

Global Health

NIH has a longstanding commitment to address both infectious and noninfectious diseases around the world, including in low- and middle-income nations that face a persistent cluster of infectious disease, malnutrition, and a growing incidence of chronic diseases and disabilities. Strategic investment by the Common Fund's Global Health program (http://commonfund.nih.gov/globalhealth/index) is intended to build capacity for research in Africa, since research in Africa is vital not only for health of Africans but for the understanding of human genetic diversity and the impact this has on health and disease everywhere. This program fosters teamwork among scientists and health organizations, builds infrastructure, and increases capacity to improve medical training and retention of trained personnel to understand and treat disease more aggressively. The Global Health program consists of two initiatives. The Medical Education Partnerships Initiative (MEPI), in partnership with the President's Emergency Plan for AIDS Relief (PEPFAR), is strengthening medical education systems in Africa and creating an environment that values and nurtures research as part of a strategy to increase the number and retention of quality health care professionals. The Human Heredity and Health in Africa (H3Africa) initiative, a partnership between NIH and the Wellcome Trust, supports the development of expertise among African scientists in the study of genomics and environmental factors of common diseases by investing in research, training, and infrastructure, and the establishment of networks of African investigators.

In FY 2016, the Global Health program will support a second phase of MEPI focused on research and career training support for junior faculty and institutional research support capacity.

Budget Policy: The FY 2016 President's Budget Request is $11.443 million for the Global Health program, a decrease of $0.659 million, or 5.4 percent below the FY 2015 Enacted level. This level of funding reflects a planned decrease in support for the H3Africa biorepository, and includes support for a second phase of MEPI as described above.

Program Portrait: Glycoscience

FY 2015 Level: $9.362 million
FY 2016 Level: $19.862 million
Change: +$10.500 million

Glycoscience is the study of how the addition of sugar modifications to proteins change the way the proteins function in important ways. All cells carry an array of sugars, or glycans, that have the ability to modulate or mediate cellular interactions with other cells, the surrounding cellular matrix, and molecules critical to development and function of complex multicellular organisms. Certain types of glycans play important roles in mediating additional cellular processes, including growth of neurons and communication between neuronal synapses. However, the complexity of carbohydrate chemistry makes the analysis of glycans inaccessible to most biomedical researchers. The Common Fund's Glycoscience program (http://commonfund.nih.gov/Glycoscience/index) will develop methodologies and resources to make the study of glycans more accessible to the broad biomedical research community. This program aims to develop methods and technologies to synthesize glycans, tools for probing and analyzing glycans and their interacting partners, and tools for data analysis and integration. The Glycoscience program will expand in FY 2016 to develop additional tools, technologies, and methods for synthesis, identification, manipulation, and analysis for a range of biomedically relevant glycans.

High-Risk High-Reward Research

Research that aims to transform science is inherently difficult; if it was either obvious or easy, the need for transformation would not exist. Although all of the Common Fund programs encourage risk-taking to overcome significant challenges in research, most of them involve designated funds for particular high risk objectives or approaches. However, the Common Fund's High-Risk High-Reward program (http://commonfund.nih.gov/highrisk/index.aspx) includes four complementary initiatives that support exceptionally creative scientists proposing innovative and transformative research in any scientific area within the NIH mission. These initiatives include the Pioneer Awards, New Innovator Awards, Transformative Research Awards, and Early Independence Awards. Since the High-Risk High-Reward program tests new ways of supporting innovation, NIH commissioned a rigorous external evaluation of the most mature of these initiatives, the Pioneer Awards. Comparison of research from Pioneer Awards, R01s (NIH's most common project-based grant mechanism), and research funded by the Howard Hughes Medical Institute (HHMI) showed that the Pioneer program has been successful in attracting and supporting research that is more innovative and has greater impact than R01s, and it is comparable to HHMI-supported research. Based on the success of the High-Risk High-Reward program, NIH ICs have embraced these funding mechanisms and have committed to their support. In addition to supporting awardees within the Common Fund's High-Risk High-Reward program, several ICs now are implementing similar programs of their own.

As noted above, Common Fund programs are designed to be short-term, thus in FY 2016, Common Fund support for the High-Risk High-Reward program decreases slightly, as ICs increase support for Pioneer, New Innovator, and Transformative Research Awards future year costs. Beginning in FY 2014, the Pioneer and Transformative Research Awards have been supported by the Common Fund during the first year, while ICs provide future years of support. Thus, the Common Fund budget of this program appears to steadily decrease over the years as the Common Fund pays less of the future year costs of each award. Additionally, ICs support the full amounts of some New Innovator Awards. IC support of the High-Risk High-Reward awards is based on the IC's enthusiasm for innovative research conducted through these awards within their IC mission. Although it is not possible to determine the exact amount of IC support in FY 2016, it is anticipated to increase based on the ICs steady increase in support over prior years.

Budget Policy: The FY 2015 President's Budget Request is $149.825 million for the High-Risk High-Reward program, a decrease of $31.246 million, or 17.2 percent below the FY 2015 Enacted level. This decrease reflects the planned increase in IC support for Pioneer, New Innovator, and Transformative Research Awards.

Human Microbiome Project

Our bodies are inhabited by trillions of microorganisms living together with our human cells. While many of these bacteria, viruses, and fungi are beneficial, others are implicated in diseases such as asthma, cancer, and obesity. In FY 2008, the Common Fund launched the Human Microbiome Project (HMP) (http://commonfund.nih.gov/hmp/index) to create a national resource of microbial sequence data, analysis tools, and methods; enable studies to identify and characterize hundreds of new human microbes; and explore causal links between changes in the microbiome and disease. HMP has achieved many notable successes, including the analysis of microbiomes from over 300 healthy individuals, leading to the insight that there is surprising

variability in microbiomes between individuals and paving the way for numerous studies that are beginning to examine how changes in the microbiome correlate with disease. More recent efforts focused on creating the first integrated dataset of microbial and host properties from cohort studies of microbiome-associated diseases. Catalyzed in part by the foundational resources and data sets generated by HMP, many NIH ICs are now investigating the human microbiome within the context of their individual research missions, and support for microbiome research across NIH has greatly increased.

HMP will undergo a planned decrease in FY 2016, as the final Common Fund initiative to gather data on proteins and metabolites produced by the microbiome winds down. Work on the microbiome is increasingly being supported by a number of NIH Institutes and Centers, in part due to the catalytic data and resources developed by HMP.

Budget Policy: The FY 2016 President's Budget Request is $1.833 million for the Human Microbiome Project, a decrease of $4.878 million, or 72.7 percent below the FY 2015 Enacted level. This decrease reflects the planned completion of the final initiative to evaluate multi-omic data (proteomic, metabolomic, etc.) to understand the microbiome's role in health and disease.

Illuminating the Druggable Genome

The overarching goal of the Common Fund's Illuminating the Druggable Genome (IDG) (http://commonfund.nih.gov/idg/index) program is to improve knowledge of the properties and functions of understudied proteins that are related to known drug targets, and are thus likely candidates to be drug targets themselves. This program focuses on hundreds of understudied proteins within four protein families that are commonly targeted for drug development –G-protein-coupled receptors, nuclear receptors, ion channels, and protein kinases. Designed as a two phase program, the current pilot phase aims to create a data resource that will catalog known information about these protein families and establish strategies for obtaining further information about the function of these proteins so that investigators can determine whether a given protein is a likely target for a disease or condition of interest. Ultimately, this program will catalyze discovery of truly novel biology and provide a wealth of new candidates for therapeutic development. Launched in FY 2014, the IDG pilot phase will undergo a review of the outcomes in FY 2015. If merited, Common Fund support of IDG would expand in FY 2016 to support the second phase of data coordination and high throughput approaches to analyze protein function.

Budget Policy: The FY 2016 President's Budget Request is $2.588 million for the Illuminating the Druggable Genome program, a decrease of $3.400 million, or 56.8 percent below the FY 2015 Enacted level. This decrease reflects the planned wind down of the pilot phase. However, if the program review reveals additional scientific challenges and opportunities in this area, the program will expand in FY 2016 to accommodate a second phase.

Knockout Mouse Phenotyping Program

Recognizing the value and utility of a readily-accessible, genome-wide collection of mouse mutants for determining how mammalian genes function, several international programs were launched to develop mutant mouse strains. Collectively, these programs have generated more than 8,000 prototype knockout mice. The Common Fund has joined together with multiple NIH ICs to support the Knockout Mouse Phenotyping Program (KOMP2), which builds upon this

existing resource by expanding the efforts to characterize the mutant strains, including mutations that result in embryonic lethality. The data are being made rapidly available to the entire research community through an internationally coordinated data coordinating center as a way to catalyze additional analyses of how specific genes contribute to health and disease conditions. Some of the genes to be characterized are expected to suggest novel drug targets and increase understanding of genetic pathways that drugs may affect. In FY 2016, the Common Fund may support a second phase of KOMP2 to enable enhanced phenotyping efforts incorporating new technology and using CRISPR (Clustered Regularly Interspaced Short Palindromic Repeat) techniques to mutate the genome more efficiently.

Budget Policy: The FY 2016 President's Budget Request is $ 0.000 million for the KOMP2 program, a decrease of $13.738 million, or 100.0 percent below the FY 2015 Enacted level. This decrease reflects the planned completion of the first phase of the program. However, if the program review reveals additional scientific challenges and opportunities in this area, the program will expand in FY 2016 to accommodate a second phase.

NIH Center for Regenerative Medicine

The NIH Center for Regenerative Medicine (NIH CRM) (http://commonfund.nih.gov/stemcells/index) aims to work through scientific and regulatory hurdles to the development of induced pluripotent stem cells (iPSCs) for clinical use. iPSCs are generated by coaxing adult cells into reverting back to an embryonic stem cell-like state, which then can generate many different cell types for use in screening or developing therapies. In the first phase of this program, NIH CRM supported pilot projects to develop the potential for using iPSCs to treat several diseases and conditions, developed stem cell lines, drafted standard consent forms, and compiled protocols and procedures used to derive, culture, and differentiate stem cells into different cell types. In the second phase, NIH CRM will support a Therapeutic Challenge award to advance efforts to develop iPSCs as therapy for age-related macular degeneration, a leading cause of blindness in the elderly. The project also will navigate through methodological and regulatory challenges that may be relevant to the broader iPSC research community. Additionally, NIH CRM will support a new facility at the National Center for Advancing Translational Science (NCATS) with three major goals: 1) establish detailed quality control standards to define differentiated (specialized) cell types and pluripotency; 2) develop methods to assess heterogeneity in cultured cells derived from iPSCs; and 3) develop standardized methods to produce mature cells meeting the quality control standards above.

Budget Policy: The FY 2016 President's Budget Request is $8.000 million for NIH CRM, no change from the FY 2015 Enacted level. The estimated funding level reflects ongoing support for the Therapeutic Challenge award and Stem Cell Technology Facility at NCATS.

Pediatric Research Program

In 2014, the Gabriella Miller Kids First Research Act was passed into law, authorizing support for pediatric research within the Common Fund. Funds were appropriated to the Common Fund from the Pediatric Research Initiative Fund in FY 2015 for this purpose. Planning activities are currently under way to identify where strategic investment by the Common Fund can have the largest impact in pediatric research. Beginning in FY 2015, the Common Fund will support initiatives in pediatric research consistent with the Common Fund mandate to support research in

areas of emerging scientific opportunities, rising public health challenges, and knowledge gaps that deserve special emphasis; would benefit from strategic coordination and planning across the NIH ICs; and that are designed to address specific goals and milestones.

After passage of the Act, the Department of the Treasury transferred $38 million to the Pediatric Research Intiative Fund, of which $12.6 million has been appropriated. Under current law, Treasury estimates that it will be able to transfer an additional $42 million in FY 2019 and $45 million in FY 2023 (in other words, one year before each Presidential election).

Budget Policy: The FY 2016 President's Budget Request is $12.600 million for Pediatric Research, no change from the FY 2015 level. These funds will continue to support pediatric research of trans-NIH relevance, with specific activities currently under development.

Science of Behavior Change

Unhealthy human behaviors, such as smoking, drug and alcohol abuse, over-eating, and a failure to exercise, all contribute to negative health outcomes and common diseases. However, it is extremely difficult not only to implement healthy behavior changes, but also to maintain these positive changes over an extended period of time. Uncovering the basic foundations of how motivation changes across a broad array of health-related behaviors can lead to more effective and efficient approaches to behavioral interventions, with the ultimate goal of improving the Nation's health. The first phase of the Common Fund's Science of Behavior Change (SOBC) (http://commonfund.nih.gov/behaviorchange/index) aimed to improve understanding of the basic mechanisms of human behavior change across a broad range of health-related behaviors and use this knowledge to develop more effective behavioral interventions. Research funded by the SOBC program has led to the identification of three broad classes of intervention targets that are highly relevant to understanding the mechanisms of behavior change: self-regulation, stress reactivity and resilience, and interpersonal and social processes.

Beginning in FY 2015, the second phase of the SOBC program will develop measures and techniques that afford a more mechanistic, experimental medicine approach to behavior change, where interventions are designed to engage the putative targets identified in phase one and engagement of those targets is routinely assessed via reliable and validated assays. The program will also include an important new focus on adherence to medical regimens and other high priority health behaviors that could benefit from this target engagement approach.

Budget Policy: The FY 2016 President's Budget Request is $ 5.782 million for the Science of Behavior Change program, a decrease of $0.948 million, or 14.1 percent below the FY 2015 Enacted level. This funding will allow continued support for initiatives to develop targets for behavior change.

Program Portrait: Stimulating Peripheral Activity to Relieve Conditions (SPARC)

FY 2015 Level: $3.518 million
FY 2016 Level: $33.518 million
Change: +$30.000 million

Modulation of peripheral nerve signals to control organ function has been recognized as a potentially powerful way to treat many diseases and conditions, such as hypertension, heart failure, gastrointestinal disorders, type II diabetes, inflammatory disorders, and more. However, the mechanisms of action for neuromodulation therapies are poorly understood, and consequently efficacy is minimal and side effects are frequent. The Common Fund's Stimulating Peripheral Activity to Relieve Conditions (SPARC) program (http://commonfund.nih.gov/sparc/index) is a high-risk, goal-driven endeavor to develop foundational knowledge and technologies for an entirely new class of neural control devices that have the potential to precisely treat a wide variety of diseases and conditions. The SPARC program will support interdisciplinary teams of investigators to deliver neural circuit maps of several organ systems, novel electrode designs, minimally invasive surgical procedures, and stimulation protocols, driven by an end goal to develop new neuromodulation therapies. The program is expected to be iterative and dynamic, with the novel technologies informing mapping efforts, and mapping results defining new technology requirements. This program will use Other Transaction Authority (OTA) for selected initiatives, which will allow the high levels of flexibility, responsiveness to adjust program components, and ability to engage with non-traditional partners as needed to address specific, high-risk goals within this complex, interdisciplinary, and rapidly evolving area of science. In FY 2016, SPARC will ramp up activities to develop neural circuit maps and generate next generation tools to stimulate peripheral nerves. Additionally, SPARC will launch new FY 2016 activities to explore the utility of existing neuromodulation devices to address new indications and develop a coordinated data resource.

Strategic Planning and Evaluation

The Common Fund's 10 year restriction on support for any given program is designed to create a churn of funds so that new challenges and opportunities may be addressed each year. Strategic planning is therefore a critical activity for the Common Fund. Conducted annually, the strategic planning process allows NIH to be nimble and adaptive to the changing scientific landscape. This process is a collaborative activity between the Division of Program Coordination, Planning, and Strategic Initiatives (DPCPSI)/Office of Strategic Coordination (OSC) and the ICs. Common Fund strategic planning encompasses both the identification of broadly relevant scientific challenges and opportunities for strategic investments using the Common Fund (Phase 1 planning), and the articulation of specific goals, milestones, and implementation plans for each broadly defined potential program topic identified in Phase 1 (Phase 2 planning). Phase 1 strategic planning involves gathering broad input from external stakeholders with diverse expertise as well as internal discussions about shared challenges and emerging opportunities. Phase 2 strategic planning involves more specific consultations with external experts, analysis of NIH and worldwide portfolios of research on the given topic, and literature reviews to articulate specific gaps and areas of research where opportunities for transformative progress are possible. Since Common Fund programs are goal driven, evaluation is critical and increasingly important as more programs near the end of their support period. Evaluation also is conducted as a partnership between DPCPSI/OSC and the ICs, and it includes both formal and informal evaluative activities. Informal evaluation involves convening grantees and NIH-wide teams to review progress, discuss new challenges, and develop strategies to adapt as part of routine program management. It also involves gathering input from external consultants and using their input, together with internal analysis, to help guide the implementation of the program. Formal

evaluations involve the development of baseline data for new programs and the development of multiple metrics of outcomes. The utility of data, resources, technologies, and other program outputs is assessed through surveys and the analysis of bibliometric data such as citation analyses.

Budget Policy: The FY 2016 President's Budget Request is $3.341 million, no change from the the FY 2015 Enacted level. The funds will be used to implement a strategic planning process to identify areas of scientific opportunity that are ripe for short-term, catalytic support from the Common Fund. Funds will also be used to evaluate the outputs and outcomes of both ongoing and mature programs and to fund the operating cost for OSC to manage the Common Fund.

Funds Available for New Programs

As mature initiatives end or transition out of the Common Fund, funds are available to address new challenges. The strategic planning process described above has produced new potential program areas where Common Fund investment could have a broad, transformative impact. A potential new Common Fund program for FY 2016 is Enabling Exploration of the Eukaryotic Epitranscriptome (E4). Although great strides have been made in understanding how chemical modifications to DNA or DNA-associated proteins can influence biological processes, much less is known about the effects of modifications to RNA. The E4 program aims to develop tools, technologies, and datasets to enable the systematic study of RNA modifications, collectively called the epitranscriptome. Ultimately, this program will provide fundamental knowledge about RNA modifications and their roles in human health and disease. Another potential new Common Fund program for FY 2016 is Mechanisms of Benefit of Physical Activity. If implemented, this program would deliver data from humans undergoing a variety of physical activity regimens. Investigators interested in many different health conditions will be able to mine this data to explore molecular and cellular mechanisms through which physical activity provides benefit. Additionally, two Common Fund programs (IDG and KOMP2) may be supported for a second phase. Plans for these activities may change in nature or scope depending on scientific opportunities and/or available funding.

Budget Policy: The FY 2016 President's Budget Request is $31.223 million to support new programs and initiatives within the Common Fund. Potential new initiatives will be selected through strategic planning activities designed to identify and understand dongaoing work in each scientific area and to determine what opportunities exist for the Common Fund to have a significant impact.