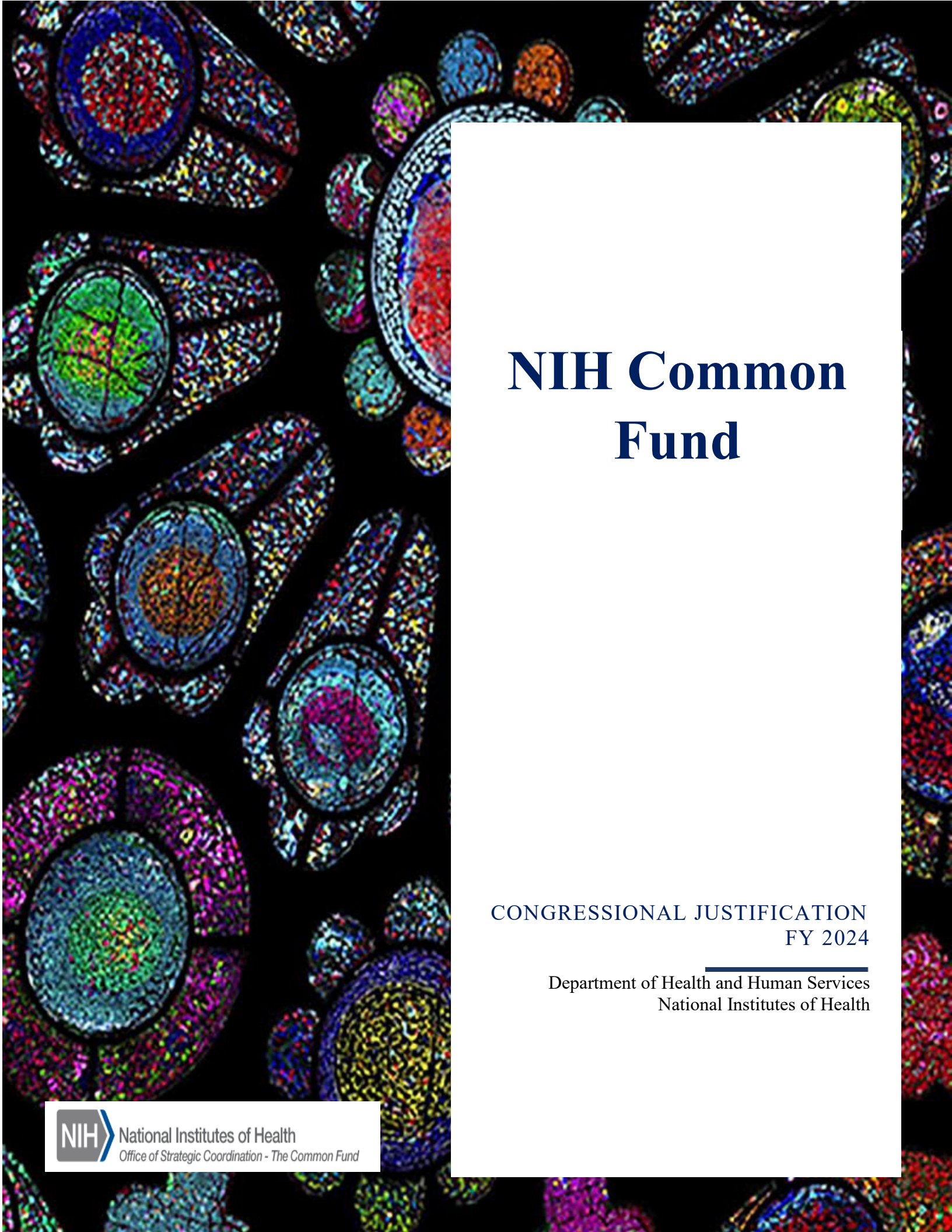

NIH Common Fund

CONGRESSIONAL JUSTIFICATION
FY 2024

Department of Health and Human Services
National Institutes of Health

NIH National Institutes of Health
Office of Strategic Coordination - The Common Fund

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DEPARTMENT OF HEALTH AND HUMAN SERVICES

NATIONAL INSTITUTES OF HEALTH

NIH Common Fund

FY 2024 Budget Table of Contents

Cover image: "Cathedral of Science" - image of cell-cell interactions in a human lymph node. Researchers in the Common Fund's Human BioMolecular Atlas Program (HuBMAP), along with collaborators, published a primer on how to use multiplexed antibody-based imaging to create complex, information-rich visualizations like this one. Image courtesy of Andrea Radtke, NIAID.

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DIRECTOR'S OVERVIEW

Director's Overview

Douglas Sheeley, Sc.D., Acting Director, Office of Strategic Coordination

The NIH Common Fund (CF) is a unique and exciting component of the NIH, specifically designed to address challenges and opportunities that are of high priority for the NIH as a whole.[246] We support research in areas of emerging scientific opportunities, public health challenges, and knowledge gaps that deserve special emphasis; that would benefit from strategic coordination and planning across NIH Institutes and Centers (ICs); and are designed to achieve specific, high-impact goals and milestones within a 5- to 10-year timeframe. Many Common Fund programs are designed to produce specific deliverables, such as data sets, tools, technologies, or fundamental scientific paradigms. We intend for these deliverables to spur subsequent scientific advances that would not be possible without our strategic investment. Common Fund programs provide a venue for NIH to respond to critical needs and scientific opportunities using a cross-agency approach, complementing IC-specific programs and activities. The Common Fund is managed by the Office of Strategic Coordination (OSC) in the NIH Office of the Director.

Team-based approaches and interdisciplinary science are integral to the science and management of the Common Fund. Most Common Fund programs involve a consortium of researchers working together across disciplines to achieve a shared, ambitious goal. Researchers within a consortium share data, ideas, and resources to accelerate program-wide progress. For example, the Stimulating Peripheral Activity to Relieve Conditions (SPARC) program brings together experts in neuroscience, biomedical engineering, electrophysiology, data science, anatomy, and clinical research to accelerate the development of therapeutic devices that modulate nerve activity for improved health.[247] Common Fund programs may also leverage additional partnerships, as appropriate, to support the goals of the program. The Community Partnerships to Advance Science for Society (ComPASS) program is establishing new models for community-led research, in which communities and researchers work collaboratively as equal partners to develop, share, and evaluate health equity structural interventions to reduce health disparities. [248]

Management of Common Fund programs also leverages a team-based approach. Each Common Fund program is managed as a partnership between OSC and NIH Institutes, Centers, and Offices (ICOs). This partnership ensures that the resources developed through Common Fund

[246] commonfund.nih.gov/
[247] commonfund.nih.gov/sparc
[248] commonfund.nih.gov/compass

programs will enable ICO-supported research across a wide range of scientific disciplines, populations, life stages, and diseases or conditions. ICOs are involved in all stages of the Common Fund program lifecycle, from program planning to implementation to transition. In FY 2022, 24 NIH ICOs co-led Common Fund programs.

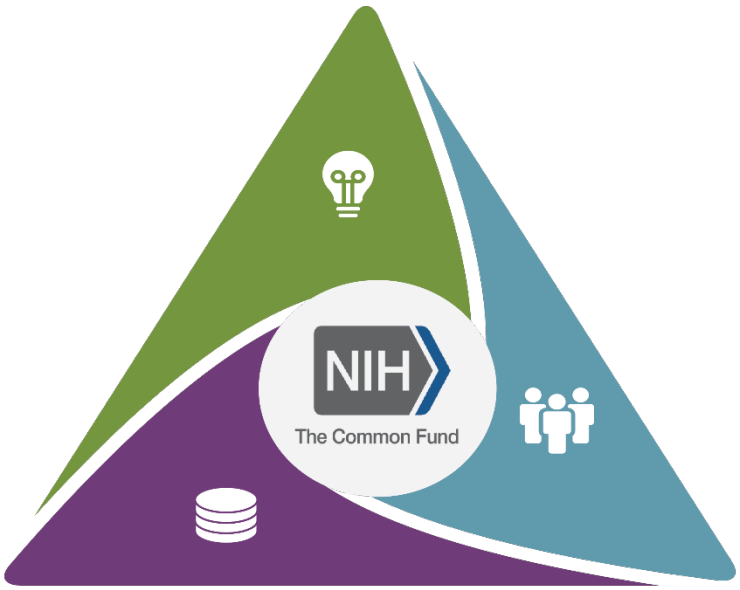
Common Fund programs are broad-reaching and span the entire NIH mission. As a general framework, however, they can be grouped into three categories: Transformational Science and Discovery, Catalytic Data Resources, and Re-engineering the Research Enterprise.

Transformational Science and Discovery
These Common Fund programs are designed to establish new scientific principles, models, and research resources to transform scientific knowledge and paths to discovery. For example, the 4D Nucleome program is establishing a fundamental understanding of how the spatial arrangement of DNA in the cell influences health and disease over time.[249]

Catalytic Data Resources
Several Common Fund programs are designed to manage and develop data for scientific discoveries by accelerating research through data resources. Also included in this category are efforts to enhance the utility of Common Fund data sets. The Bridge to Artificial Intelligence (Bridge2AI) program is generating flagship data sets and best practices for the collection and preparation of data sets amenable to AI and machine learning approaches to address biomedical and behavioral grand challenges.[250]

Re-engineering the Research Enterprise
Common Fund also supports programs that are designed to transform how biomedical and behavioral research is

The goals of Common Fund programs align with three general categories



Transformational Science and Discovery
These programs are designed to establish new scientific principles, models, and research resources to transform scientific knowledge and paths to discovery.

Catalytic Data Resources
These programs are designed to manage and develop data for scientific discoveries by accelerating research through data resources.

Re-Engineering the Research Enterprise
These programs are designed to transform how we do biomedical and behavioral research, how we make the biomedical workforce as robust as possible to ensure new perspectives and ideas contribute to discovery, how we transition that research into prevention and therapies, and how those successful prevention and therapies can be shared broadly.

[249] commonfund.nih.gov/4Dnucleome
[250] commonfund.nih.gov/bridge2ai

conducted, how research results are translated into new treatments and preventive strategies, and how to make the biomedical workforce as robust as possible. For example, the Somatic Cell Genome Editing (SCGE) program is developing a translational pipeline for somatic cell genome editing therapies through improved, Investigational New Device (IND)–enabling technologies.[251]

Science for Everyone by Everyone

The Common Fund supports science for everyone by everyone – through programs that strengthen the biomedical workforce, engage diverse participants in research studies, address research opportunities to support health throughout the lifespan, and develop targeted prevention strategies, treatments, and cures. Diversity, equity, inclusion, and accessibility (DEIA) are critical considerations in all our efforts related to the workforce we support, the science we conduct, and the populations and communities we serve. The importance of DEIA is also highlighted by two programs that directly address major impediments to achieving health equity for all. The Transformative Research to Address Health Disparities and Advance Health Equity program is supporting innovative research projects to develop, implement, or disseminate effective interventions to advance health equity.[252] The ComPASS program is addressing the persistent challenge of health disparities by developing, sharing, and evaluating community-led structural interventions to change the social, physical, or economic environments that shape health behaviors and outcomes and contribute to health disparities.

Strengthening the Biomedical Workforce

Strengthening the biomedical workforce is an explicit goal of several Common Fund programs, which support efforts to ensure that the biomedical research workforce benefits from the full range of scientific talent. For example, the Faculty Institutional Recruitment for Sustainable Transformation (FIRST) program aims to establish a more inclusive and diverse biomedical research workforce through support of cluster hiring and institutional culture change efforts, providing evidence-backed strategies for diversifying the biomedical research workforce.[253] The Common Fund Data Ecosystem (CFDE), an infrastructure investment that aims to enhance the use of Common Fund data resources, will support multiple training and outreach efforts to develop a diverse user base for Common Fund data, equipping researchers from all backgrounds with in-demand skills for cloud computing and data analysis.[254]

Other Common Fund programs, such as the New Innovator and Early Independence Awards, specifically target early-career investigators with bold ideas to enable new perspectives and ideas to contribute to scientific discovery. [255,256] These awards do not require substantial preliminary data, thus removing a major roadblock for scientists who are in the beginning stages of establishing research independence. We are making robust efforts to enhance the diversity of New Innovator and Early Independence Awardees through targeted outreach and technical assistance.

[251] commonfund.nih.gov/editing
[252] commonfund.nih.gov/healthdisparitiestransformation
[253] commonfund.nih.gov/first
[254] commonfund.nih.gov/dataecosystem
[255] commonfund.nih.gov/newinnovator
[256] commonfund.nih.gov/earlyindependence

Engaging Diverse Research Participants
Diverse representation in research studies is required to generate knowledge, treatments, and prevention strategies that benefit all segments of the population. Several Common Fund programs conduct clinical research that engages research participants from diverse backgrounds, including Molecular Transducers of Physical Activity in Humans Consortium (MoTrPAC), Nutrition for Precision Health (NPH), and Acute to Chronic Pain Signatures (A2CPS).[257,258,259] Other Common Fund programs build foundational resources that enable studies of a variety of cellular and tissue characteristics, using human samples from diverse donors. These include a platform to map spatial organization of healthy cells in the human body from the Human BioMolecular Atlas Program (HuBMAP), atlases of senescent (no longer dividing) cells through the Cellular Senescence Network (SenNet), and systematic documentation of genomic variation across tissues in the Somatic Mosaicism across Human Tissues (SMaHT) program.[260,261,262]

Supporting Health throughout the Lifespan
Many Common Fund programs build foundational resources or discover new knowledge about basic biological processes that are relevant to all stages of development and throughout the lifespan. Additionally, some programs focus on study populations that represent specific life stages. The Gabriella Miller Kids First Pediatric Research program leverages data from pediatric patients and their families to uncover new insights into the biology of childhood cancer and structural birth defects, including discovery of shared genetic pathways between these conditions.[263] SenNet is exploring the biology of senescent cells, which accumulate as we age and play important roles in health, disease, and aging. MoTrPAC includes physical activity studies in children, adults, and older adults, exploring how exercise benefits our health throughout the lifespan.

Developing Targeted Preventions and Cures
As biomedical research moves away from a "one size fits all" approach to prevention and cures, several Common Fund programs are on the forefront of developing foundational data and tools to enable precision health approaches and develop more targeted prevention strategies and therapies. MoTrPAC is uncovering the molecules that change in response to physical activity for people of different ages, sexes, body compositions, and fitness levels. In the future, this information may enable clinicians to make more specific exercise recommendations to patients based on their unique characteristics. Similarly, NPH aims to develop algorithms that predict individual responses to nutrition and dietary patterns by examining the interactions between diet, genes, proteins, microbiome, metabolism, and other individual factors. The Illuminating the Druggable Genome (IDG) program is expanding our understanding of potentially druggable protein targets that are currently understudied, in the

[257] commonfund.nih.gov/MolecularTransducers
[258] commonfund.nih.gov/nutritionforprecisionhealth
[259] commonfund.nih.gov/pain
[260] commonfund.nih.gov/HuBMAP
[261] commonfund.nih.gov/senescence
[262] commonfund.nih.gov/smaht/
[263] commonfund.nih.gov/KidsFirst

hopes that these proteins may lead to new drug targets that are more specific and may lead to fewer side effects.[264]

The Common Fund fulfills a unique role at NIH, supporting research that is often broad-reaching across scientific disciplines and provides catalytic data, tools, and resources with the potential to advance many different research areas. This focus on broadly relevant scientific research areas and resources meant that the Common Fund was well-poised to rapidly respond to the COVID-19 pandemic, supporting both new COVID-19-related research projects, as well as existing studies that could appropriately add COVID-19-related research while still maintaining focus on the original project goals. Common Fund programs are carefully planned to address major challenges and opportunities across biomedical research. Therefore, although several Common Fund activities were rapidly launched to address critical health needs related to the COVID-19 pandemic, continued investment in Common Fund programs to provide foundational support for the biomedical research enterprise remains crucially important. These activities are essential to continue even in times of major upheavals in and rapid change of research priorities, helping to ensure the biomedical research community is well-poised to respond nimbly to new and unpredictable issues that emerge in the future.

Since Common Fund programs are designed with clearly defined goals and milestones, it is critically important to rigorously monitor ongoing progress to ensure programs are on track, and to adjust if needed. Additionally, as Common Fund programs are intended to produce valuable resources and knowledge to spur subsequent research advances, it is also important to assess the impact of each program and its deliverables on the broad biomedical research landscape. We thoroughly evaluate Common Fund programs during their lifetime, and outcomes are assessed as programs end. Continuous, ongoing evaluation during program implementation allows flexibility to modify program management and/or budgets in response to rapidly evolving scientific landscapes, technical challenges, or other unforeseen challenges or opportunities. New challenges and opportunities will be addressed in FY 2024 from funds made available as programs end, move to other sources of support, or require decreased support as indicated by evaluative data.

[264] commonfund.nih.gov/IDG

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The Common Fund

Bold science, catalyzing discoveries

The NIH Common Fund provides a dedicated source of support for scientific programs that are high-priority for NIH as a whole

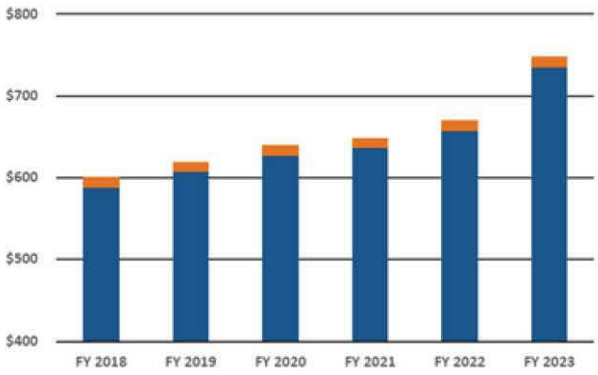
SUPPORTING multi-disciplinary research efforts

INVESTING in time-limited, goal-driven programs

ACCELERATING emerging science

REMOVING research roadblocks

FUNDING HISTORY



The FY 2024 President's Budget request is $735.0 million.

Blue = Common Fund base appropriation
Orange = Gabriella Miller Kids First Pediatric Research

FACTS AND FIGURES

23 Scientific Programs in FY 2022

529 Principal Investigators (PIs)*

- **183** High-Risk, High-Reward (HRHR) PIs*
- **102** Early-Career HRHR PIs*

136 Competing Research Project Grants*

24 NIH Institutes, Centers, and Offices Co-Leading Programs in FY 2022

**yearly averages FY 2018 – FY 2022*

THE OFFICE OF STRATEGIC COORDINATION LEADERSHIP

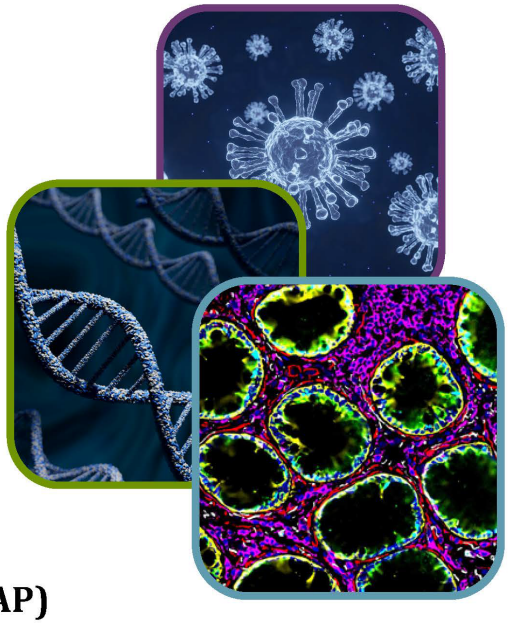
Douglas Sheeley, Sc.D.

Dr. Sheeley became the Deputy Director of the Office of Strategic Coordination (OSC) in 2022 and the Acting Director of OSC in 2023.

SELECTED RESEARCH ACCOMPLISHMENTS

COVID-19 Research

Common Fund awards have advanced innovative research on SARS-CoV-2 and COVID-19, uncovering genes that may influence risk, developing ultrasonic imaging for SARS-CoV-2-infected lungs, identifying disrupted gene regulation as a cause of COVID-related loss of smell, and developing technology for faster and more accurate detection of virus.



Somatic Cell Genome Editing (SCGE)

SCGE is advancing genome editing therapies, so that safe and effective therapies can reach patients sooner. SCGE has developed new methods for tissue-specific gene delivery, generated improved genome editors, and optimized detection of unintended effects of genome editing. These resources are leading to advances in genome editing to treat conditions such as sickle cell disease, progeria, and deafness.

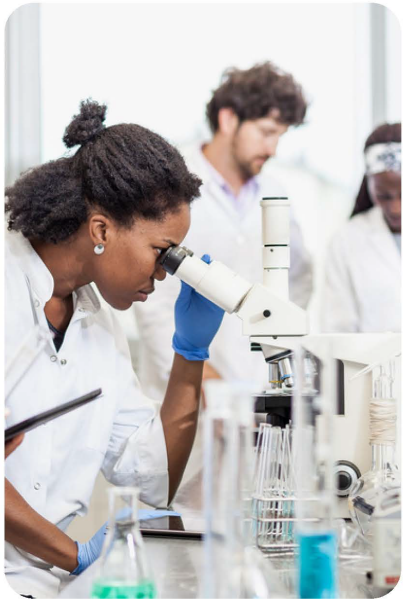
Human BioMolecular Atlas Program (HuBMAP)

HuBMAP is developing widely available resources to enable mapping of the human body at the single cell level. Groundbreaking HuBMAP resources include a 3D reference atlas connecting anatomy, structure, cell types, and biomarkers; methods to identify different forms of proteins within tissues; and visualization tools for complex imaging data.

SELECTED CURRENT ACTIVITIES

Cellular Senescence Network (SenNet)

SenNet is transforming our understanding of senescent (no longer dividing) cells by generating complementary human and mouse atlases of senescent cells and developing critically needed technologies.



Faculty Institutional Recruitment for Sustainable Transformation (FIRST)

FIRST is testing new approaches to fostering inclusive and diverse research environments through faculty cohort hiring, professional development and retention, and institutional culture change.

Somatic Mosaicism across Human Tissues (SMaHT)

SMaHT is analyzing genomic mosaicism (variation) in a variety of human tissues, leading to new understanding of how mosaicism influences health and disease.

PLANNING FOR THE FUTURE

Several topics are in development for potential program launch in FY 2024.

Advancing Health Communication Science and Practice

To investigate, develop, test, and disseminate new approaches for effective and equitable health communication

Human Virome Program

To characterize the enormous number of viruses that healthy humans harbor and determine their impact on immune function and human health

Advancing Non-Animal Approaches

To foster development of sophisticated non-animal approaches, including cell-based methods, computer modeling, and human tissue sampling

MAJOR CHANGES IN THE PRESIDENT'S BUDGET REQUEST

Major Changes in the Budget Request

Major changes by budget mechanism and/or budget activity detail are briefly described below. Note there may be overlap between budget mechanisms and activity detail, and these highlights will not sum to the total for the FY 2024 President's Budget request for the Common Fund, which is equal to the FY 2023 Enacted level, for a total of $735.0 million.

Research Project Grants (+$22.4 million; total $357.4 million): The Common Fund expects to support a total of 427 Research Project Grant (RPG) awards in FY 2024, up from 402 in FY 2023. Estimated awards for FY 2024 include 266 Noncompeting RPGs and 161 Competing RPGs.

Research Centers (-$19.5 million; total $165.0 million): The Common Fund expects to support a total of 82 Research Centers in FY 2024, down from 95 in FY 2023. This change reflects the planned completion of awards supporting Clinical Research Centers within the Enhancing the Diversity of the NIH-Funded Workforce program.

Other Research (-$3.0 million; total $168.9 million): The Common Fund expects to support a total of 106 Other Research awards in FY 2024, a decrease of 2 awards from 108 in FY 2023. Within this category, the Common Fund supports Other Transaction (OT) awards in several programs, including Stimulating Peripheral Activity to Relieve Conditions (SPARC), Human BioMolecular Atlas Project (HuBMAP), Bridge to Artificial Intelligence, and the Common Fund Data Ecosystem (CFDE).

Research Training (-$4.3 million; total $0.6 million): The Common Fund expects to support a total of 7 full time training positions (FTTPs) as new Research Training Individual Awards within the CFDE. The decrease in support for Research Training reflects the planned completion of Research Training Institutional Awards within the Enhancing the Diversity of the NIH-Funded Workforce program.

BUDGET MECHANISM TABLE

(Dollars in Thousands)	FY 2022 Final	FY 2023 Enacted		FY 2024 President's Budget		FY 2024 +/- FY 2023 Enacted	
	Amount	No.	Amount	No.	Amount	No.	Amount
Research Projects:							
Noncompeting	$194,172	207	$155,618	266	$209,923	59	$54,305
Administrative Supplements	20,214	*(13)*	7,484	*(10)*	5,675	*(-3)*	-1,809
Competing:							
Renewal	1,082	0	0	0	0	0	0
New	105,381	195	171,846	161	141,799	-34	-30,047
Supplements	0	0	0	0	0	0	0
Subtotal, Competing	$106,463	195	$171,846	161	$141,799	-34	-$30,047
Subtotal, RPGs	$320,849	402	$334,948	427	$357,397	25	$22,449
SBIR/STTR	0	0	0	0	0	0	0
Research Project Grants	$320,849	402	$334,948	427	$357,397	25	$22,449
Research Centers:							
Specialized/Comprehensive	$112,190	80	$154,432	79	$152,494	-1	-$1,938
Clinical Research	13,789	11	15,576	0	0	-11	-15,576
Biotechnology	8,429	2	10,000	3	12,500	1	2,500
Comparative Medicine	9,218	2	4,500	0	0	-2	-4,500
Research Centers in Minority Institutions	0	0	0	0	0	0	0
Research Centers	$143,626	95	$184,508	82	$164,994	-13	-$19,514
Other Research:							
Research Careers	$0	0	$0	0	$0	0	$0
Cancer Education	0	0	0	0	0	0	0
Cooperative Clinical Research	5,581	16	14,462	16	14,995	0	533
Biomedical Research Support	0	0	0	0	0	0	0
Minority Biomedical Research Support	0	0	0	0	0	0	0
Other	146,756	92	157,500	90	153,945	-2	-3,555
Other Research	$152,337	108	$171,962	106	$168,940	-2	-$3,022
Total Research Grants	$616,813	605	$691,418	615	$691,331	10	-$87
Ruth L Kirchstein Training Awards:		FTTPs		FTTPs		FTTPs	
Individual Awards	$0	0	$0	7	$600	7	$600
Institutional Awards	7,326	304	4,857	0	0	-304	-4,857
Total Research Training	$7,326	304	$4,857	7	$600	-297	-$4,257
Research & Develop. Contracts	$8,304	2	$8,011	2	$9,008	0	$997
(SBIR/STTR) (non-add)	*(0)*	*(0)*	*(0)*	*(0)*	*(0)*	*(0)*	*(0)*
Intramural Research	8,003	0	690	0	383	0	-307
Res. Management & Support	29,555	0	30,025	0	33,679	0	3,654
Res. Management & Support (SBIR Admin) (non-add)	*(0)*	*(0)*	*(0)*	*(0)*	*(0)*	*(0)*	*(0)*
Construction	0		0		0		0
Buildings and Facilities	0		0		0		0
Total, Common Fund	$670,001	605	$735,001	615	$735,001	10	$0

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

BUDGET BY INITIATIVE

Common Fund Program (Dollars in Thousands)	FY 2022 Final	FY 2023 Enacted	FY 2024 President's Budget
4D Nucleome	28,673	28,394	28,378
Acute to Chronic Pain Signatures	18,600	783	3,338
Bridge to Artificial Intelligence (Bridge2AI)	30,506	35,406	32,398
Cellular Senescence Network (SenNET)	39,908	41,850	43,850
Common Fund Data Ecosystem	0	9,900	21,000
Community Partnerships to Advance Science for Society (ComPASS) Program	0	23,401	27,082
Enhancing the Diversity of the NIH-Funded Workforce	44,237	39,478	0
Extracellular RNA Communication	11,236	315	0
Faculty Institutional Recruitment for Sustainable Transformation (FIRST)	30,803	52,886	72,688
Gabriella Miller Kids First Pediatric Research	13,053	13,080	12,983
Global Health	823	85	0
Glycoscience	472	0	0
Harnessing Data Science for Health Discovery and Innovation in Africa (DSI-Africa)	12,455	16,418	16,418
Health Care Systems Research Collaboratory	225	0	0
High-Risk Research	187,175	171,995	198,958
NIH Director's Pioneer Award	*45,814*	*44,633*	*42,469*
NIH Director's New Innovator Award Program	*73,745*	*58,963*	*87,320*
Transformative Research Award	*44,308*	*44,473*	*44,329*
NIH Director's Early Independence Award Program	*23,309*	*23,926*	*24,840*
Human BioMolecular Atlas Project (HuBMAP)	36,452	44,636	34,586
Illuminating the Druggable Genome	13,394	7,900	390
Metabolomics	106	0	0
Molecular Transducers of Physical Activity	36,418	20,514	21,231
Nutrition for Precision Health	20,323	40,838	39,324
Somatic Cell Genome Editing	46,199	46,960	51,754
Somatic Mosaicism across Human Tissues (SMaHT)	0	22,906	25,913
S.P.A.R.C. - Stimulating Peripheral Activity to Relieve Conditions	35,865	31,741	39,277
Transformative High Resolution Cryo-Electron Microscopy (CryoEM)	19,883	25,508	4,255
Transformative Research to Address Health Disparities	19	19,887	17,010
Undiagnosed Diseases Network	17,697	11,547	0
Strategic Planning, Evaluation, and Infrastructure	25,481	28,575	16,400
Subtotal Common Fund	670,001	735,001	707,231
New Initiatives in Common Fund	0	0	27,770
Total Common Fund	670,001	735,001	735,001

JUSTIFICATION OF BUDGET REQUEST

NIH Common Fund

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

Budget Authority (BA):

	FY 2022 Final	FY 2023 Enacted	FY 2024 President's Budget	FY 2024 +/- FY 2023
BA	$670,001,000	$735,001,000	$735,001,000	0
FTE	0	0	0	0

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

Overall Budget Policy. The FY 2024 President's Budget request for the Common Fund is $735.0 million, equal to the FY 2023 Enacted level. This level of funding will support high priority activities within existing programs and support the launch of several new programs, as described below.

Program Descriptions

The Common Fund supports over 20 programs, most of which consist of a series of integrated initiatives that collectively address a set of goals that can be achieved within 5 to 10 years. Planned activities and budgets for Common Fund programs are strategically developed, with clear milestones defined throughout the lifetime of the program to enable measurement of progress towards pre-defined goals. Therefore, Common Fund programs often undergo planned budget shifts driven by the needs and activities for each program.

Several Common Fund programs will receive their last year of support in FY 2023; funds are therefore not requested in FY 2024 for these programs. These include Enhancing the Diversity of the NIH-Funded Workforce, Extracellular RNA Communication, Global Health, and the Undiagnosed Diseases Network. [265,266,267,268,269] Information on these programs and their accomplishments can be found on the program websites.

[265] commonfund.nih.gov/diversity
[266] commonfund.nih.gov/exrna
[267] commonfund.nih.gov/globalhealth
[268] commonfund.nih.gov/Diseases
[269] CF provided partial funding for the Undiagnosed Diseases Network in FY 2023 as part of the program's transition to full support from other components of NIH beginning in FY 2024.

Highlighted below are programs that exemplify the high priority science to be supported in FY 2024, and/or which are undergoing significant programmatic changes in FY 2024.

Acute to Chronic Pain Signatures (A2CPS)

A2CPS aims to improve understanding of the transition from acute to chronic pain following injury. Currently, this transition is poorly understood, and therefore prevention or treatment is difficult. A2CPS is addressing this challenge by developing an objective set of biomarkers (a "signature") to predict susceptibility of transitioning from acute to chronic pain. The high prevalence of chronic pain has contributed to the current opioid epidemic, and a signature to predict susceptibility to transition from acute to chronic pain could help accelerate therapy development and ultimately guide pain prevention strategies. A2CPS enhances the objectives of the NIH Helping to End Addiction Long-term® Initiative, or NIH HEAL Initiative®, an agency-wide effort to speed scientific solutions to end the opioid public health crisis.[270] A2CPS will benefit the HEAL research priority to enhance pain management. Increased funds requested in FY 2024 reflect expanded support for data generation centers and the data integration and resource center, following the planned completion of clinical studies in FY 2023.

Community Partnerships to Advance Science for Society (ComPASS)

Launched in FY 2023, the ComPASS program aims to accelerate the science on health disparities and advance health equity research. This program addresses the critical need to address the complex nature of health disparities through structural interventions, efforts that aim to change the social, physical, economic, and/or political environments that may shape or constrain health behaviors and outcomes. The goals of ComPASS are to: 1) develop, share, and evaluate community-driven structural health equity interventions that leverage partnerships across multiple sectors to reduce health disparities, and 2) develop a new health equity research model for community-led, multisectoral structural intervention research across NIH and other federal agencies. Funds requested in FY 2024 will support the scale-up of this program as it supports research on health equity structural interventions and coordinates across program activities.

Budget Policy. The FY 2024 President's Budget request is $3.3 million, an increase of $2.6 million or 326.2 percent compared with the FY 2023 Enacted level. This increase will support additional data generation, data integration, and resource development activities.

Cellular Senescence Network (SenNet)

As we age, tissues throughout the body accumulate small numbers of specialized cells that no longer divide, called senescent cells. There are many unanswered questions about how, when, why, and where senescent cells form and what impact they have on human health and disease. However, their rarity and diversity make them difficult to study. The SenNet program aims to comprehensively identify and characterize the differences in senescent cells across the body, across various states of human health, and across the lifespan. SenNet will provide critically needed resources, including atlases of senescent cells in various tissues from humans and animals, as well as novel tools and technologies to identify and characterize these rare cells. Funds requested in FY 2024 will support tissue mapping centers, technology development and application, and a data coordination and organization center.

[270] NIH HEAL Initiative and Helping to End Addiction Long-term are registered service marks of the U.S. Department of Health and Human Services.

Budget Policy. The FY 2024 President's Budget request is $43.9 million, an increase of $2.0 million or 4.8 percent compared with the FY 2023 Enacted level. This level of support will allow for continued funding for tissue mapping, technology development and application, and data coordination and integration.

Common Fund Data Ecosystem (CFDE)

As data-intensive strategies are increasingly undertaken to achieve the goals of Common Fund programs, infrastructure to address challenges facing all data management centers has become necessary. This infrastructure, referred to as the Common Fund Data Ecosystem (CFDE), is enabling researchers to query across and use multiple Common Fund data sets, providing training for users to operate on the data in a cloud environment, and ensuring that Common Fund data continue to be available after individual programs are completed. The CFDE will amplify the impact of many Common Fund programs by enabling researchers to interrogate multiple disparate data sets, and thereby make new kinds of scientific discoveries that were not possible before. Prior to FY 2023, support for the CFDE was included within the Strategic Planning, Evaluation, and Infrastructure budget line. With the launch of a new stage in FY 2023, support for the new CFDE activities appears as a stand-alone line in the budget by initiative table. Ongoing FY 2023 activities from the first stage remain within the Strategic Planning, Evaluation, and Infrastructure item.

Budget Policy. The FY 2024 President's Budget request is $21.0 million, a decrease of $1.2 million or 5.2 percent compared with the FY 2023 Enacted level (consisting of total support from the FY 2023 CFDE budget line as well as the FY 2023 amount for CFDE within Strategic Planning, Evaluation, and Infrastructure). The new stage of CFDE will continue to engage with many Common Fund data generating programs and coordinate across the entire data ecosystem, enhancing the findability and accessibility of data and increasing emphasis on training and outreach to develop a diverse user base for Common Fund data resources.

Faculty Institutional Recruitment for Sustainable Transformation (FIRST)

The FIRST program aims to establish a more inclusive and diverse biomedical research workforce through support of cluster hiring and institutional culture change efforts. Based on early results from other cohort-based recruitment programs, FIRST will establish a faculty cohort model for hiring, mentoring, and professional development; integrated, institution-wide approaches to address bias, faculty equity, mentoring, and work/life issues; and a coordination and evaluation center to conduct independent evaluations of program impacts. Through widespread dissemination of evidence-based approaches, FIRST will provide approaches and tools to enable many more research institutions to develop cultures of inclusive excellence. The NIH expects its efforts to lead to the recruitment of talented researchers from all groups, to improve the quality of the training environment, to balance and broaden the perspective in setting research priorities, and to positively impact scientific discovery. Increased funds requested in FY 2024 will support hiring the third and final faculty cohort, while continuing to support the first two faculty cohorts and program-wide coordination and evaluation efforts.

Budget Policy. The FY 2024 President's Budget request is $72.7 million, an increase of $19.8 million or 37.4 percent compared with the FY 2023 Enacted level. This increase will

support hiring the third and final faculty cohort and ongoing efforts to establish and maintain cultures of inclusive excellence at all awardee institutions, as well as program-wide coordination and evaluation activities.

Gabriella Miller Kids First Pediatric Research (Kids First)

The Kids First program aims to generate new insights into childhood cancer and birth defects through development of a widely accessible data resource containing high-quality genetic and clinical data from pediatric patient cohorts, along with associated computational tools to facilitate data analysis. There is considerable evidence for undiscovered connections between childhood cancer and structural birth defects, and therefore examining these data sets together will facilitate new discoveries and novel ways of thinking about these conditions. Kids First has developed one of the largest pediatric data resources of its kind, with over 63 conditions represented and including 55,000 genomes from 22,000 participants. This data resource has enabled new biological insights into genetic causes of conditions such as childhood neuroblastoma, congenital heart defects, disorders of sex development, Ewing sarcoma, orofacial cleft, and syndromic cranial dysinnervation. Researchers have also used the data resource to study a novel drug treatment for pediatric diffuse midline gliomas. Funds requested in FY 2024 will be used to support pediatric research, consistent with the Gabriella Miller Kids First Research Act, and remain constant at the statutory level set by this legislation for FY 2023. These funds will be used to continue support for the Kids First Data Resource, genetic sequencing of patient cohorts, and research projects to demonstrate the value of Kids First data.

Budget Policy. The FY 2024 President's Budget request is $13.0 million, a decrease of $0.1 million or 0.8 percent compared with the FY 2023 Enacted level. Programmatic funding remains constant at the $12.6 million statutory level and will be used to conduct pediatric research. The remainder of the funds are requested in the regular Common Fund appropriation to support research management activities.

High-Risk, High-Reward Research (HRHR)

The HRHR program supports exceptionally creative scientists proposing innovative and transformative research in any scientific area within the NIH mission through four complementary initiatives: Pioneer Award, New Innovator Award, Transformative Research Award, and Early Independence Award.[271] These awards are intended to support transformative science that is inherently difficult and risky, but necessary to accelerate the pace of scientific discovery and advance human health. To improve financial stewardship, starting in FY 2021, the New Innovator awards provide support for years one through three of the projects in the first fiscal year and years four and five in the fourth fiscal year; thus, this change in funding approach resulted in a temporary decline in funding levels for FYs 2021 – 2023. The increased funding request for FY 2024 results from this being the first year that will include non-competing commitments generated by the FY 2021 cohort of awards. Funds requested in FY 2024 will be used to support additional innovative projects with the potential for extraordinary impact.

Budget Policy. The FY 2024 President's Budget request is $199.0 million, an increase of $27.0 million or 15.7 percent compared with the FY 2023 Enacted level. This increase includes

[271] commonfund.nih.gov/highrisk

Molecular Transducers of Physical Activity in Humans

Physical activity has been demonstrated to contribute to health in a wide variety of ways, and lack of physical activity is at the root of many common chronic health problems. However, we have a limited understanding of the molecular mechanisms that underlie how physical activity provides health benefits. A better understanding of the molecules that underlie the benefits of physical activity could lead to the development of improved, personalized exercise recommendations, as well as therapies for individuals who are unable to exercise due to illness or disability. The Molecular Transducers of Physical Activity in Humans Consortium (MoTrPAC) is cataloging the biological molecules affected by physical activity in humans, identifying some of the key molecules that underlie the systemic effects of physical activity and characterizing their function. Program progress was slowed due to interruption of clinical studies during the COVID-19 pandemic, so additional years of funding are required for this program to achieve maximum impact while still complying with the long-standing CF policy of supporting programs for a maximum of 10 years. Funds requested in FY 2024 will continue to support human and animal physical activity studies and associated molecular analysis of samples. For more information, see the section

non-competing commitments from the FY 2021 cohort of New Innovator awards, and will allow for continued support of highly creative, high-impact projects.

Human BioMolecular Atlas Program (HuBMAP)

HuBMAP is developing a framework for mapping the human body at single cell resolution to provide a new foundation for understanding human health and diagnosing, monitoring, and treating disease. In complex, multicellular organisms like humans, the proper functioning of organs and tissues is dependent on the interaction, spatial organization, and specialization of individual cells. However, since there are an estimated 37 trillion cells in an adult human body, determining the functions of and relationship among these cells is a monumental undertaking. To address this challenge, HuBMAP is developing an open and global platform to map healthy cells in the human body, generating foundational tissue maps, and developing tools, technologies, and resources for broad dissemination to the entire biomedical research community.

Budget Policy. The FY 2024 President's Budget request is $34.6 million, a decrease of $10.1 million or 22.5 percent compared with the FY 2023 Enacted level. Decreased funding requested in FY 2024 reflects the planned scaling down of technology development and tissue mapping efforts, while continuing to support data coordination, integration, and analysis. This level of funding will support ongoing data coordination, integration, and analysis within the HuBMAP program.

Illuminating the Druggable Genome (IDG)

Three protein families – G-protein coupled receptors, ion channels, and protein kinases – are well-established "druggable" protein families that have potential to be targets of pharmaceuticals. However, only a small number of proteins within each of these families are well-studied, representing an opportunity to greatly expand the druggable genome by catalyzing research into these understudied proteins. These well-studied proteins are often present in many cells throughout the body, and drugs that target these proteins might therefore cause widespread adverse effects. In contrast, the lesser-known members of these protein families may be present in fewer tissues, and thus have potential as specific drug targets that lead to fewer side effects. IDG is developing data, tools, and technologies to enable investigation of understudied proteins

within these three protein families, expanding the repertoire of potential drug targets that may have high potential to impact human health. Having largely completed the goals of developing these resources for the biomedical research community, IDG will undergo a planned scaling down of the program in FY 2024.

Budget Policy. The FY 2024 President's Budget request is $0.4 million, a decrease of $7.5 million or 95.1 percent compared with the FY 2023 Enacted level. This decrease reflects the planned scaling down of the program.

Nutrition for Precision Health, powered by the *All of Us* Research Program (NPH)

Nutrition plays an integral role in human development and in the prevention and treatment of disease. However, there is no perfect, "one size fits all" diet. The goal of the NPH program is to develop algorithms that predict individual responses to food and dietary patterns. Ultimately, the predictive algorithms developed through NPH are anticipated to enable tailored dietary recommendations to be provided by physicians, as well as development of tools to allow individuals to make more informed decisions about healthy food choices. NPH will leverage the *All of Us* infrastructure and recent advances in biomedical science, such as artificial intelligence (AI) and microbiome research, to provide unprecedented opportunities to examine associations between nutrition and a variety of long-term outcomes.[272] This program addresses some of the important scientific opportunities identified in the first Strategic Plan for NIH Nutrition Research.[273] Additionally, this program is closely coordinated with activities of the Office of Nutrition Research to ensure NIH-wide nutrition efforts are complementary, not duplicative. Funds requested in FY 2024 will support ongoing clinical nutrition studies, data analysis, AI and data modeling, processing and storage of biosamples, and research coordination.

Budget Policy. The FY 2024 President's Budget request is $39.3 million, a decrease of $1.5 million or 3.7 percent compared with the FY 2023 Enacted level. This level of support will enable continued clinical studies and associated activities to generate nutrition-related data sets and resources for the research community.

Somatic Cell Genome Editing (SCGE)

The SCGE program aims to develop quality tools to perform safe and effective genome editing in human patients, ultimately reducing the time and cost to develop new therapies for diseases caused by changes to the genetic code. These tools will need to function specifically on the disease gene to minimize unintended consequences. They will also need to be delivered selectively to the cells within the body that are affected by the disease, avoiding unaffected cells and reproductive cells so that changes are not passed on to future generations. The second phase of the SCGE program is launching in FY 2023 and aims to accelerate the development of genome-editing therapies by developing data, resources, and best practices that will enable the research community to conduct genome-editing clinical trials that align with U.S. Food and Drug Administration (FDA) standards and regulations. These program activities include facilitating Investigational New Drug (IND)-enabling studies, establishing pathways to regulatory approval, and disseminating successful strategies for initiating first-in-human clinical trials. Funds

[272] allofus.nih.gov/
[273] niddk.nih.gov/about-niddk/strategic-plans-reports/strategic-plan-nih-nutrition-research

requested in FY 2024 will provide additional support for platform clinical trials of genome editors in multiple diseases.

Budget Policy. The FY 2024 President's Budget request is $51.8 million, an increase of $4.8 million or 10.2 percent compared with the FY 2023 Enacted level. This increase will provide additional support for platform clinical trials, as well as support for ongoing efforts in technology development and optimization of genome editing-based therapeutic leads to enable IND studies.

Somatic Mosaicism across Human Tissues (SmaHT)

The SmaHT program aims to transform our understanding of how somatic mosaicism, or genetic variation within an individual, influences biology and disease. Somatic mosaicism arises over the lifetime as changes to the inherited DNA sequence occur in different cells, resulting in genetically distinct cells within an individual. There is mounting evidence that somatic mosaicism plays important roles in biological processes such as development, aging, and disease. However, technical challenges in detecting rare somatic variations mean this phenomenon is understudied. Launching in FY 2023, SmaHT will catalog somatic variants in select tissues from diverse human donors, develop innovative sequencing tools and analyses methods, and create a workbench to integrate analysis of somatic variation with the human genome. Funds requested in FY 2024 will be used to support these activities.

Budget Policy. The FY 2024 President's Budget request is $25.9 million, an increase of $3.0 million or 13.1 percent compared with the FY 2023 Enacted level. This increase will support efforts in somatic variant discovery, technology and tool development, data analyses, and program-wide coordination.

Stimulating Peripheral Activity to Relieve Conditions (SPARC)

The SPARC program is accelerating the development of novel neuromodulatory therapeutic devices to advance bioelectronic medicine through provision of foundational data and tools. Modulation of nerve function has the potential to treat a variety of diseases and conditions, but there is an urgent need to better understand the precise pattern of connections between nerves and their end organs, so that the nerves can be precisely and specifically stimulated. SPARC is addressing this need by generating maps and tools to identify and influence therapeutic targets within the neural circuitry of a wide range of organs and tissues. Ultimately, this therapeutic strategy could offer new treatment options for diverse diseases and conditions such as hypertension, heart failure, gastrointestinal disorders, type 2 diabetes, inflammatory disorders, and more. Now in its second stage, SPARC is investigating the anatomy and functional connectivity of the human vagus nerve, developing open-source neural engineering technologies, and supporting challenges for innovators to demonstrate proof of principle neuromodulation therapeutic benefits.

Budget Policy. The FY 2024 President's Budget request is $39.3 million, an increase of $7.5 million or 23.7 percent compared with the FY 2023 Enacted level. This increased level of support will enable new Challenge competition prizes, while also maintaining efforts in mapping the human vagus nerve and developing new technologies.

Transformative High Resolution Cryo-Electron Microscopy (CryoEM)

The CryoEM program is enabling novel discoveries in structural biology by broadening access to cutting-edge cryo-electron microscopy and cryo-electron tomography techniques and training.[274] These approaches enable researchers to determine the structure of biological molecules with unprecedented detail and accuracy. However, the high cost of required equipment and a lack of training in these techniques mean that many researchers cannot leverage these critical approaches, and therefore opportunities for novel discoveries are missed. By providing increased access, the CryoEM program is anticipated to catalyze fundamental biological discoveries, as well as accelerate development of vaccines and therapeutics.

Budget Policy. The FY 2024 President's Budget request is $4.3 million, a decrease of $21.2 million or 83.3 percent compared with the FY 2023 Enacted level. The decreased support from the Common Fund reflects a planned transition of cryo-electron microscopy centers and training activities to other NIH sources of support.

Transformative Research to Address Health Disparities and Advance Health Equity

The Transformative Research to Address Health Disparities and Advance Health Equity program is a bold approach to fund unusually innovative research projects with the potential to have a major impact on inequalities in health outcomes through development, dissemination, and/or implementation of innovative and effective interventions that address health disparities and advance health equity. Additionally, through dedicated support for researchers at under-resourced institutions that educate significant numbers of students from underrepresented backgrounds, this initiative also aims to expand the research base dedicated to health disparities research at minority-serving institutions. Examples of current research projects include a multisector coalition to transform mental health services in Harlem, investments in Black neighborhoods to address social determinants of racial health disparities, and interventions to disrupt social determinants of poverty among youth and young adults. Originally included as an initiative within the HRHR program, this program now is a stand-alone program within the Common Fund budget. Funds requested in FY 2024 will continue to support innovative research with the potential to generate transformative interventions that support equitable health outcomes for all.

Budget Policy. The FY 2024 President's Budget request is $17.0 million, a decrease of $2.9 million or 14.5 percent compared with the FY 2023 Enacted level. This decrease results from a temporary increase in funding in FY 2023 to provide a limited-term opportunity to researchers from underresourced institutions to strengthen a promising application for NIH funding. FY 2024 funds will continue to support the two cohorts of investigators receiving awards through the Transformative Research to Address Health Disparities and Advance Health Equity program.

[274] commonfund.nih.gov/CryoEM

Strategic Planning, Evaluation, and Infrastructure

Common Fund management requires that certain activities be undertaken for the benefit of the Common Fund as a whole. These include activities related to strategic planning, evaluation, and infrastructure.

Strategic planning is undertaken every year to identify new scientific challenges and opportunities that may be prime for dedicated investment via a Common Fund program. The Common Fund strategic planning first identifies broad scientific areas that are priorities for the NIH as a whole and then establishes a focused strategy for investments that will catalyze research progress in those areas. The initial idea (or concept) gathering phase of strategic planning often involves input from stakeholders with diverse expertise, as well as internal discussions about shared challenges and emerging opportunities. The strategy development phase of strategic planning involves specific consultations with external experts, analysis of NIH and worldwide research portfolios, and literature reviews to articulate specific gaps and areas of biomedical and behavioral research where opportunities for transformative progress are possible.

Since Common Fund programs are goal-driven, evaluation is critical to monitoring progress and developing strategies to adapt program management. Evaluation 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, expert opinion, and the analysis of bibliometric data such as citation analyses.

Funds Available for New Initiatives

Planning for potential new FY 2024 Common Fund programs leveraged the wide-ranging expertise of NIH's senior leadership and scientific staff. Planning efforts led to the identification and further development of three potential program ideas:

- Advancing Health Communication Science and Practice – to investigate, develop, test, and disseminate new approaches for effective and equitable health communication, including measuring communication exposure and impact, addressing misinformation, engaging communities, and building trust[275]
- Human Virome Program – to characterize the enormous number of viruses that healthy humans harbor and determine their impact on immune function and human health[276]
- Advancing Non-Animal Approaches – to foster development of sophisticated non-animal approaches, including cell-based methods, computer modeling/simulation, and human

[275] commonfund.nih.gov/healthcommsresearch
[276] commonfund.nih.gov/humanvirome

tissue studies, with consideration for the complexity of the biomedical research area and the current applicability and translatability of the non-animal model

Additionally, the CFDE will launch a second stage of investment, building on the success of the initial efforts as described above.