



## 2023 Meeting of the Diabetes Centers' Directors

May 31, 2023

The Natcher Building Building 45 (main NIH campus) Bethesda, MD

#### 2023 NIDDK Diabetes Center Directors' Meeting

#### May 31, 2023

#### Building 45; William H. Natcher Building; Natcher Conference Center NIH Campus, Bethesda, MD 20814

#### Agenda

7:30-8:00 AM	Meeting Check-in			
Session 1 - Updates				
8:00 - 8:15	Welcome and Brief Updates (C. Silva)			
8:15 - 8:25	The view from NIDDK: Perspectives & Opportunities (G. Rodgers)			
8:25-8:45	NIDDK Strategic Plan (G. Germino)			
8:45-8:55	NIDDK Efforts to Pursue Pathways to Health for All (P. Thornton)			
8:55-9:15	DEM perspective (W. Cefalu)			
9:15-9:30	Update on Clinical Scientist Workforce (L. Spain)			
9:30-9:45	NIDDK Medical Student Summer Program (J. Stafford)			
9:45-10:15	Data Management and Sharing (J. Grethe, dkNET)			
10:15-10:30 am	BREAK			
Session 2 – Fifty-year history of the DRCs				
<b>10:30-11:00</b> (A. Powers et al)				

11:00 – 11:15 PM Move to Breakout rooms

#### Session 3 – Breakout Groups

#### 11:15-12:00 Overall Discussion

- What is your vision for the future of the Diabetes Research Centers
- > How do DRCs align with the NIDDK Strategic Plan and how best to transition to future priorities
- > What should be the emphasis and goals of the new mission statement

12:00-12:15 box lunch arrives

#### 12:00-1:30 Group Discussions

#### Group 1: Synergy Room C1

**Chair:** Clay Semenkovich, Washington University in St. Louis **Members:** Owen McGuiness; Jeffrey Pessin; Martin Myers; Jean Schaffer; David D'Alessio; Steven Kahn; Kevan Herold; Barbara Kahn (virtual)

#### **Discussion Points:**

- How do we support more interactions among the DRCs?
- How do we increase synergy with other DEM and NIDDK funded Centers-particularly those at same institution as the DRC?
- How to increase the outreach to diabetes researchers not at a DRC and how to broaden outreach to other institutions with a smaller base of diabetes researchers

#### Group 2: DRC Structure Room C2

**Chair:** Don McClain, Wake Forest School of Medicine (North Carolina DRC) **Members:** Alan Saltiel; Elimelda Ongeri; Domenico Accili; Gerald Shulman; Lori Sussel; Scott Soleimanpour

#### **Discussion Points:**

- How do we best bring in new Centers to the Program. Should we consider specialized/smaller Centers and/or encourage multi-institutional centers?
- How do we increase outreach to HBCUs and other Minority Serving Institutions?
- How to address succession planning?

#### Group 3: Workforce Room G1

**Chair:** Jane Reusch, University of Colorado, Denver **Members:** Meredith Hawkins; Raghu Mirmira; Rick Kraemer; George King; Alex Soukas; Doris Stoffers; Robert Considine; John Stafford

#### **Discussion Points:**

- How can the DRCs program better support trainees and physician scientists?
- How can we leverage the Centers Program to support the transition of early-stage investigators to and beyond K awards?
- How do we increase the mentoring and networking aspect of the DRCs and particularly the P&F program?

#### Group 4: Biomedical Cores Room G2

**Chair:** Carmella Evans-Molina, Indiana University **Members:** Andrew Stewart; Anna Gloyn; Jose Florez; David Piston; Mitchell Lazar; Timothy Garvey; Alvin Powers

#### **Discussion Points:**

- How should Cores be positioned in the next Phase of the Centers Program?
- How should support of diabetes/endocrinology specific cores be prioritized as opposed to institutional (generalized) cores? What about cost- sharing? Charge back fees?
- Under what circumstances should NIDDK Center funds be used for the support of institutional cores?
- How do we incentivize regional/national cores?

#### 1:30-3:00 pm GROUP REPORTS

**Facilitator:** C. Silva Each group will report back by Chair (10 mins) plus Q&A (10 minutes).

#### 3:00-3:30 PM DISCUSSION

**Facilitator:** W. Cefalu Overall discussion and charge to each DRC and group regarding reports back to EEP.

#### DRC Attendees 2023

#### Albert Einstein- Mount Sinai Diabetes Center Jeffrey Pessin, PhD Meredith Hawkins, MD MS Andrew Stewart, MD University of Chicago Raghavendra Mirmira, MD PhD **Stanford University** Anna Gloyn, PhD Fredric Kraemer, MD **UCSD-UCLA** Alan Salitel, PhD Washington University Clay Semenkovich, MD David Piston, PhD Boston Area Diabetes and Endocrinology Research Center (BADERC) Jose Florez, MD PhD Alexander Soukas, MD PhD Barbara Kahn, MD University of Michigan Scott Soleimanpour, MD Martin Myers, MD PhD University of Colorado Lori Sussel, PhD Jane Reusch, MD Joslin Diabetes Center George King, MD Jean Schaffer, MD University of Pennsylvania Mitchell Lazar, MD PhD Doris Stoffers, MD PhD North Carolina Diabetes Research Center Donald McClain, MD PhD Elimelda Ongeri, PhD David D'Alessio, MD University of Alabama at Birmingham Timothy Garvey, MD University of Washington Steven Kahn, MB ChB Indiana University Carmella Evans-Molina, MD PhD Robert Considine, PhD

#### **DRC Attendees 2023**

Yale University Kevan Herold, MD Gerald Shulman, MD PhD **Columbia University** Domenico Accili, MD Vanderbilt Diabetes Research and Training Center Alvin Powers, MD John Stafford, MD PhD Owen McGuiness PhD **UCSD-Dk-NET** Jeff Grethe, PhD **NIDDK** Corinne Silva, PhD Lisa Spain, PhD Saul Malozowski, MD PhD MBA William Cefalu, MD Griffin Rodgers, MD MACP Gregory Germino, MD Pamela Thornton, PhD Saira Mehmood, PhD Maureen Monaghan Center, MD CDCES Guillermo Arreaza-Rubin, MD Carol Haft, PhD Arthur Castle, PhD Xujing Wang, PhD



## Diabetes Research Centers Directors' Meeting

May 31, 2023 Bethesda, MD







- > 8 AM-10:15 Session 1 Updates (NIDDK and others)
- 10:15-10:30 BREAK
- > 10:30-11 AM Session 2 History of the DRCs
- > 11 AM-11:15 Move to Breakout Rooms
- > 11:15-1:15 Session 3 Breakout Groups
- 1:15-1:30 BREAK
- > 1:30-3:00 Group Reports
- > 3:00-3:30 Discussion
- 3:30 Adjourn



## Administrative Updates

### Boston Area Diabetes Endocrinology Research Center (BADERC) PI, Jose Florez

### University of Chicago DRC Multi-PI, Raghu Mirmira (contact) and Graeme Bell

Joslin Diabetes Center PI, Jean Schaffer



Pilot and Feasibility Programs (2019-present)





## Clinical Pilot and Feasibility Studies for Emerging Physician Scientists (2019)

## DRC/CDTR: COVID-19 Collaborative Research Opportunities (2020)

P and F Studies Involving Cystic Fibrosis Related Diabetes (2021)





### Clinical Pilot and Feasibility Studies for Emerging Physician Scientists

#### <u>2020</u>

#### Kara Mizokami-Stout, MD

University of Michigan Hybrid closed loop adoption and patterns of use in veterans with type 1 diabetes mellitus

#### Michael Wilkinson, MD

UCSD-UCLA

*Effect of time-restricted eating on catecholamine-sensitivity of adipose tissue in obese adults* 

#### <u>2021</u>

#### Alyssa Huang, MD

University of Washington The interactions of Disordered Eating Behavior, Glycemic Control, and Adiposity on Hypothalamic Gliosis in Adolescents and Young Adults with Type 1 Diabetes

#### <u>2022</u>

#### **Christy Anne Foster, MD**

University of Alabama-Birmingham Epigenetic Age in African American Adolescents with Type 2 diabetes

#### Melissa Elafros, MD

University of Michigan **CDTR** *The Flint Neuropathy Study* 

#### <u>2023</u>

Joshua Cook, MD Columbia University Role of Hyperinsulinemia in NAFLD: Pancreatic Clamp Pilot & Feasibility Study

#### Matthew Ettleson, MD

University of Chicago Determining Longitudinal Outcome Measures of Hypothyroidism Management

### DEM Diabetes Centers and COVID-19 Collaborative Research Opportunities

Context matters: harnessing the CDTR/DRC network to examine the influence of community-level factors and of the COVID-19 pandemic on diabetes-related behaviors in emerging Latino communities Deborah Salvo, PhD, CDTR – Washington University in St. Louis Carrie Howell, PhD, DRC – The University of Alabama at Birmingham

#### Immunopathology of the COVID-19 pancreas

**Diane Saunders, PhD, DRC**, Vanderbilt University **Dirk Homann, MD, MA, DRC**, Einstein-Mount Sinai

## 4

Accelerate AHEAD Study: Evaluating Diabetes Technology Use in Primary Care Amisha Wallia, MD MS Chicago CDTR Shivani Agarwal, MD MPH NY-Regional CDTR

### P and F Studies Involving Cystic Fibrosis Related Diabetes

#### GOAL

to utilize Diabetes expertise at NIDDK funded DRCs and CDTRs to investigate Cystic Fibrosis Related Diabetes (awarded through the Dartmouth CF Center)

#### **FY2022**

#### PI: Dieter Egli

Columbia University Diabetes Research Center Cystic Fibrosis Transmembrane Conductance Regulatory Protein (CFTR) function in human beta cells in a stem cell model of Cystic Fibrosis Related Diabetes (CFRD)

PI: Kyle Gaulton

UCSD-UCLA Diabetes Research Center Single cell analysis of the human pancreas in cystic fibrosis

### AGENDA

- 8:15 8:25 The view from NIDDK: Perspectives & Opportunities (**G. Rodgers**)
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### National Institute of Diabetes and Digestive and Kidney Diseases

## Diabetes Research Centers (DRCs) Directors' Meeting

### Griffin P. Rodgers, M.D., M.A.C.P.

Director

National Institute of Diabetes and Digestive and Kidney Diseases

May 31, 2023



### **Diabetes Research Centers: Brief Historical Perspective**

#### Sen. Warren Magnuson



- Championed creation of ٠ **Diabetes Research Centers** in Congress
- First Center (Vanderbilt) ٠ awarded in September 1973

#### Education Act (P.L. 93-354) – July 1974 1. LII 2: N2/ dia 973 **WATIONAL DIABETES RESEARCH AND EDUCATION ACT, 1973** Public Law 93-354 AN ACT July 23, 1974 [S. 2830] To amend the Public Health Service Act to provide for greater and more effective 3-1 efforts in research and public education with regard to diabetes mellitu HEARING Be it enacted by the Senate and House of Representatives of the National Dia United States of America in Congress assemble betes Mellitus Research and Education Act. BEFORE THE SHORT TITLE SUBCOMMITTEE ON HEALTH 42 USC 289c-2 SECTION 1. This Act may be cited as the "National Diabetes Mellitus Research and Education Act". COMMITTEE ON FINDINGS AND DECLARATION OF PURPOS LABOR AND PUBLIC WELFARE SEC. 2. (a) The Congress makes the following findings: 42 USC 289c-2 (1) Diabetes mellitus is a major health problem in the United UNITED STATES SENATE States which directly affects perhaps as many as ten million Americans and indirectly affects perhaps as many as fifty million Americans who will pass the tendency to develop diabetes mellitus NINETY-THIRD CONGRESS FIRST SESSION to their children or grandchildren or to both. (2) Diabetes mellitus is a family of diseases that has an impact on virtually all biological systems of the human body. S. 17 (3) Diabetes mellitus is the fifth leading cause of death from TO AMEND THE PUBLIC HEALTH SERVICE ACT TO PR disease, and it is the second leading cause of new cases of blindness. FOR GREATER AND MORE EFFECTIVE EFFORTS IN RESE (4) The severity of diabetes mellitus in children and most AND PUBLIC EDUCATION WITH REGARD TO DIAL adolescents is greater than in adults, which in most cases involves MELLITUS greater problems in the management of the disease.

National Diabetes Research and

(5) The complications of diabetes mellitus, particularly cardio S. 648 vascular degeneration, lead to many other serious health problems. TO AMEND THE PUBLIC HEALTH SERVICE ACT TO EX THE AUTHORITY OF THE NATIONAL INSTITUTE OF AR TIS. METABOLISM, AND DIGESTIVE DISEASES IN MED expectancy. ADVANCE THE NATIONAL ATTACK ON DIABETES DECISION FEBRUARY DEPARTY diabetes mellitus. ise of the Committee on Labor and Public We

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WASHINGTON : 197

(6) Uncontrolled diabetes mellitus significantly decreases life (7) There is convincing evidence that the known prevalence of diabetes mellitus has increased dramatically in the past decade. (8) The citizens of the United States should have a full understanding of the nature of the impact of diabetes mellitus. (9) The attainment of better methods of diagnosis and treatment of diabetes mellitus deserves the highest priority. (10) The establishment of regional diabetes research and training centers throughout the country is essential for the development of scientific information and appropriate therapies to deal with

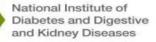
(11) In order to provide for the most effective program against diabetes mellitus it is important to mobilize the resources of the National Institutes of Health as well as the public and private organizations capable of the necessary research and public education in the disease.

#### National Commission on Diabetes



**Authorized Diabetes Research** and Training Centers (DRTCs)





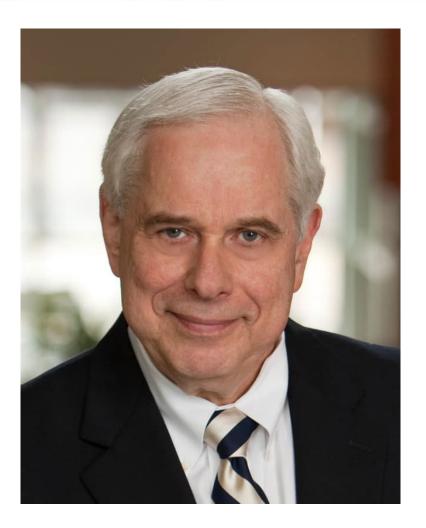
Sources: Diabetes Care 2014;37:3139–3142; Historical Perspective: A Brief History of NIDDKsponsored Diabetes Centers, Dr. Daryl Granner, Vanderbilt University

### **Diabetes Research Centers: Brief Historical Perspective**





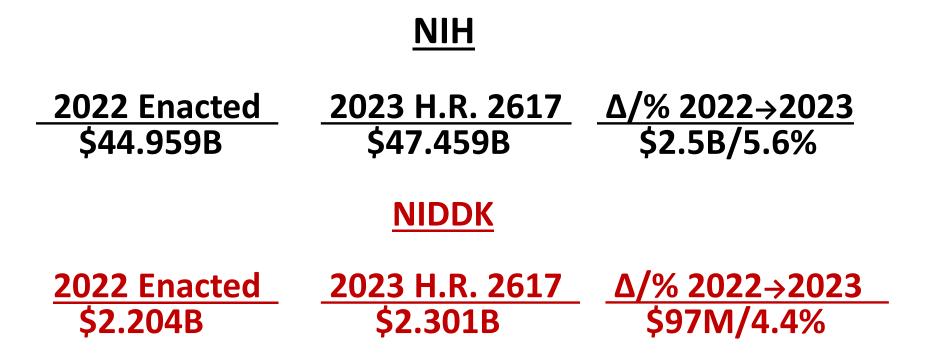
## Dr. Bob Sherwin (1942-2023)



- Director of the Yale Diabetes Center from 1993 until his retirement in 2018
- World-renowned endocrinologist and leader in the field of diabetes research
- Published over 400 articles in peer-reviewed journals and received countless scientific awards
- Pioneer of testing technology that preceded the current artificial pancreas systems



### FY 2023 Omnibus L-HHS-Ed Appropriations\*



\*All dollars exclude Special Diabetes Program funds. NIDDK dollars include \$8.55M to restore cuts to the mandatory Special Diabetes Program that resulted from Budget Control Act sequestration.



## FY 2024 President's Budget Request\*

NIH

2023 Enacted	2024 PBR	<u>Δ/% 2023→2024</u>		
\$47.459B	\$48.270B	\$811M/1.7%		
	<u>NIDDK</u>			
2023 Enacted	2024 PBR	<u>Δ/% 2023→2024</u>		
<b>\$2.301B</b>	<b>\$2.303B</b>	<b>\$2M/0.001%</b>		

\*All dollars exclude Special Diabetes Program funds.



## Next Competition: 2025 and beyond

## How should NIDDK look toward evolving the DRCs to meet the current needs of diabetes researchers and to align with the recent NIDDK Strategic Plan?



## Challenges for the Future: 2025 and Beyond

- How to increase synergy and better leverage resources across DRCs?
  - and with other NIDDK Centers and Programs
- How to provide opportunities to support new Centers and incorporate new areas of science?
- Strengthen P&F program (including mentoring plan)?
- Increase critical mass of new investigators to the field and increase diversity of Centers and outreach to URMs?

NIDDK looks forward to having the **future vision and efforts of the DRCs** align with the Institute's Strategic Plan, to continue moving toward our overall goal of achieving **pathways to health for all**.



### **NIDDK Strategic Plan for Research**



https://www.niddk.nih.gov/about-niddk/strategic-plans-reports/niddk-strategic-plan-for-research



**Contact NIDDK** 

www.niddk.nih.gov

Health Information Center Toll-free: 800-860-8747 Email: <u>healthinfo@niddk.nih.gov</u>





National Institute of Diabetes and Digestive and Kidney Diseases

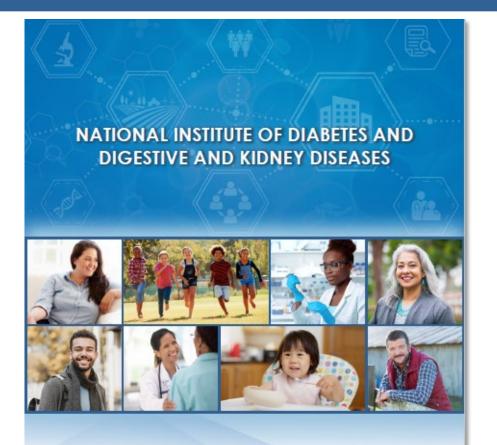
## **NIDDK Strategic Plan for Research**

### Diabetes Research Centers 50<sup>th</sup> Anniversary Symposium May 31, 2023

Gregory G. Germino, M.D.



## **NIDDK Strategic Plan for Research**



Strategic Plan for Research Pathways to health for all

December 2021

Overarching Plan to complement the NIDDK's disease-specific planning efforts

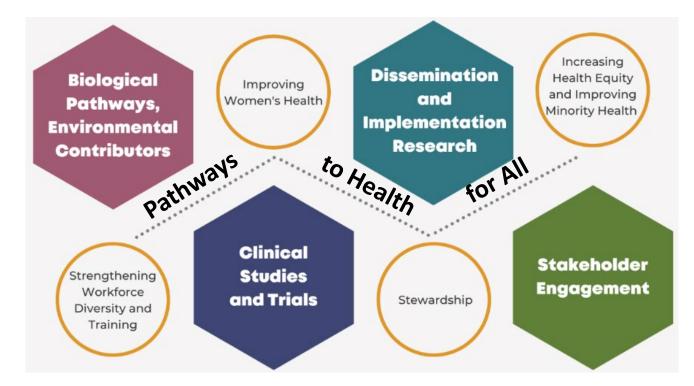
Extensive input from:

- leading researchers and patient advocates on a Working Group of Council
- numerous organizations and individuals who responded to public Requests for Information (RFIs)
- Council

### Released the 2021-2026 plan in Dec. 2021

## **Overarching theme of our Strategic Plan**

"Empowering a multidisciplinary research community; engaging diverse stakeholders; and leveraging discoveries of connections among diseases across NIDDK's mission to improve prevention, treatment, and health equity pursuing pathways to health for all"



# Advance understanding of biological pathways and environmental contributors to health and disease.

- Identify and characterize factors that affect human health
- Analyze links between biology, behavior, environment – disease heterogeneity and disparities
- Develop innovative technologies and resources
- Enhance and diversify workforce



Advance pivotal clinical studies and trials for prevention, treatment, and cures in diverse populations.

- Enhance development/testing of diagnostics, therapeutics, prevention strategies
- Increase participant diversity in clinical trials
- Bolster workforce development and training
- Use data science to improve clinical studies
- Optimize infrastructure and resources



Advance research to disseminate and implement evidence-based prevention strategies and treatments in clinics and community settings, to improve the health of all people, more rapidly and more effectively.

- Improve D&I research to accelerate the reach of prevention/treatments
- Evaluate programs/policies initiated by communities, others
- Study major unanticipated events
- Engage and partner with stakeholders
- Enhance workforce



Advance stakeholder engagement — including patients and other participants as true partners in research.

- Involve stakeholders (patients, caregivers, others) in each step of the research process
- Ensure representation of populations affected by NIDDK diseases
- Address barriers to stakeholder engagement



# Stewardship

### **Examples**

- Increase diversity of research workforce
- Enhance research training and career development
- Attract and retain physician/surgeon scientists
- Promote data science
- Improve rigor and reproducibility

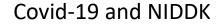


## NIDDK: At the Intersection of Health Disparities and Covid-19

#### Covid-19 and health disparities

Rate ratios compared to White, Non- Hispanic persons	American Indian or Alaska Native, Non- Hispanic persons	Asian, Non- Hispanic persons	Black or African American, Non- Hispanic persons	Hispanic or Latino persons
Cases <sup>1</sup>	1.8x	0.6x	1.4x	1.7x
Hospitalization <sup>2</sup>	4.0x	1.2x	3.7x	4.1x
Death <sup>3</sup>	2.6x	1.1x	2.8x	2.8x





Asthma	Hypertension	Obesity (BMI ≥ 30)	Diabetes	Chronic Kidney Disease	Severe Obesity (BMI ≥ 40)	2 Conditions*	3 or More Conditions*
1.5x	3x	Зx	Зx	4x	4.5x	4.5x	5x

COVID-19

\*Conditions include asthma, obesity, diabetes, chronic kidney disease, severe obesity, coronary artery disease, history of stroke and COPD.



National Institute of Diabetes and Digestive and Kidney Diseases

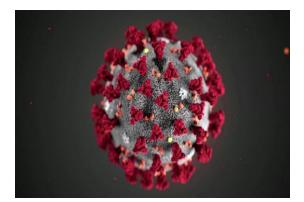
## NIDDK's Efforts to Pursue Pathways to Health for All

### Diabetes Research Centers 50<sup>th</sup> Anniversary Symposium May 31, 2023

Pamela L. Thornton, Ph.D., Program Official, CDTR and Acting Senior Advisor for Workforce Diversity and Health Equity



# **Spotlight: Collision of Unequal Impacts**



#### The Washington Post Democracy Dies in Darkness

Coronavirus vaccines face trust gap in Black and Latino communities, study finds

#### Black Americans Face Alarming Rates of Coronavirus Infection in Some States

Data on race and the coronavirus is too limited to draw sweeping conclusions, experts say, but disparate rates of sickness — and death — have emerged in some places.

#### The Striking Racial Divide in How 19 Has Hit Nursing Homes

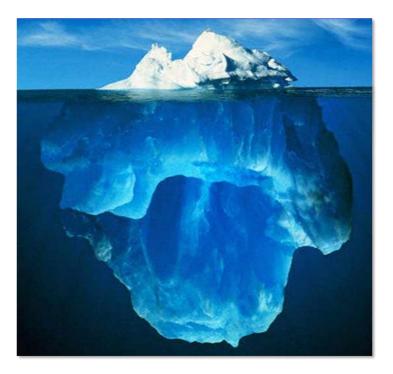
**Rural America Could Be the Region** Hardest Hit by the COVID-19 Outbreak

#### For Latinos and Covid-19, Doctors Are Seeing an 'Alarming' Disparity

The outsized infection rate among Hispanics in some states could hobble efforts to quash the spread of Covid-19, prompting states like Oregon to step up testing and take emergency measures.



# Why do we see these disparities so consistently?



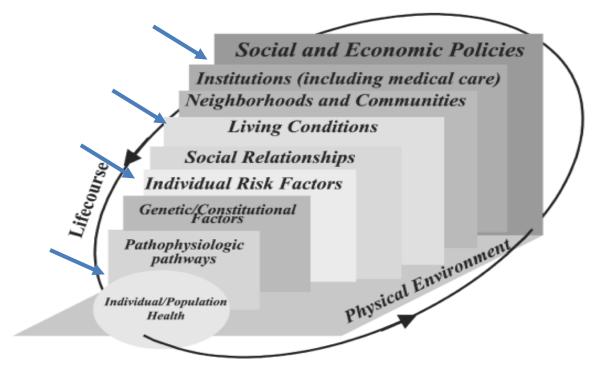
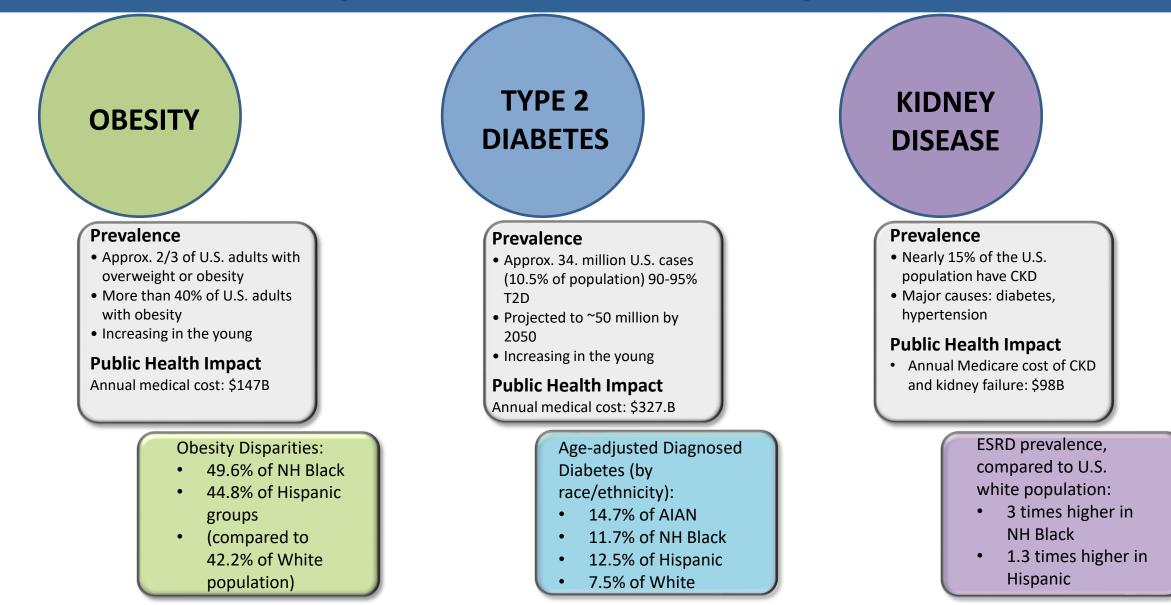


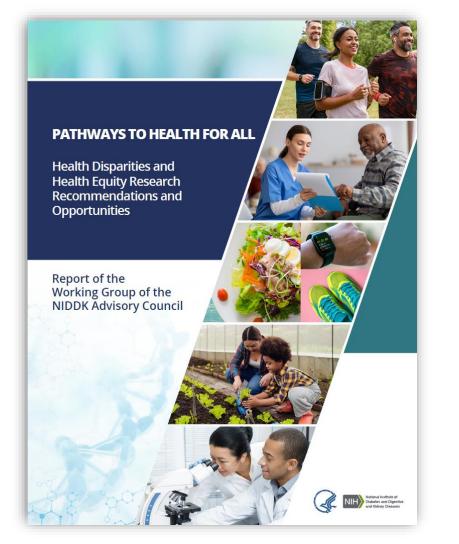
Figure 1 - Multilevel Model of Disease Causation.

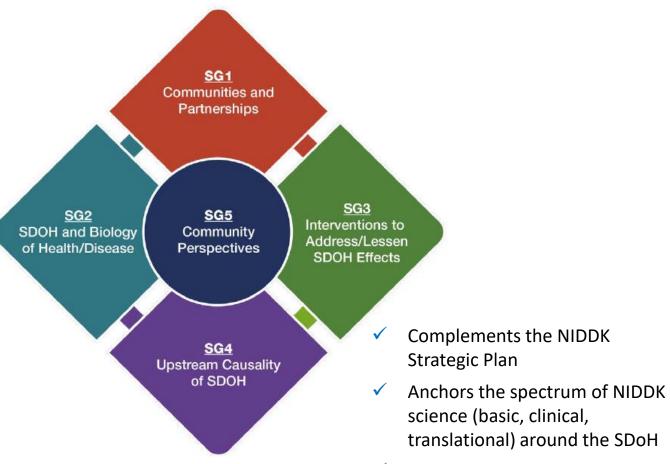
A multilevel, socio-ecological model of disease causation can help us understand and address these pernicious patterns

# NIDDK's "4 C's"--Common, Chronic, Consequential and Costly: Implications for Health Disparities



## Pathways to Health for All: NIDDK Health Disparities and Health Equity Research Report





 Embeds equity and diverse community and patient perspectives into research

https://www.niddk.nih.gov/about-niddk/strategic-plans-reports/pathways-health-all

## PATHWAYS TO HEALTH FOR ALL

#### **Research Recommendations**



Strengthen community engagement through partnership, power sharing, and capacity building to improve research



Advance research on the mechanisms by which biological, behavioral, environmental, and structural factors interact to affect health, disease, and resilience



Advance research on interventions and studies to address racism, health-related social needs, and social determinants of health



Promote new methods, measures, tools, and technologies to accelerate achievement of health equity research goals



Enhance NIDDK collaboration, structures, and programs to support robust research in health equity

# Recommendation 1 Centering Community in Research



NY Regional Center for Diabetes Translation Research (Albert Einstein College of Medicine)

Strengthen community engagement through partnership, power sharing, and capacity building to improve research

- Opportunity 1-1: Encourage, build, and sustain trusted collaborations with community members
- Opportunity 1-2: Partner and engage with trusted community entities in research
- Opportunity 1-3: Build capacity and infrastructure for community members and community-based organizations to engage in research
- Opportunity 1-4: Identify new models for collaboration between investigators and groups that can provide care and foster healing from trauma and injustice as needs arise

#### **Recommendation 2**

### How Structural, Environmental Factors "Get under the Skin" to Cause Disease

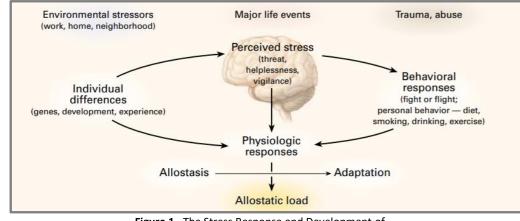
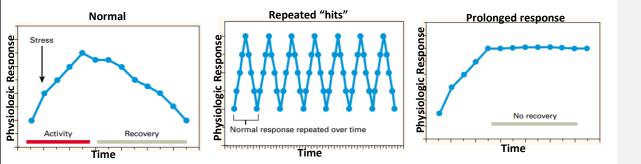


Figure 1. The Stress Response and Development of Allostatic Load



Advance research on the mechanisms by which biological, behavioral, environmental, and structural factors interact to affect health, disease, and resilience

- Opportunity 2-1: Explore how structural racism, discrimination, stigma, and other experiences of psychosocial trauma affect biological and behavioral processes and result in or worsen NIDDK diseases and conditions
- Opportunity 2-2: Determine the relationships between structural factors, SDOH, and (epi) genetics and the effects of each on health disparities and disease heterogeneity
- Opportunity 2-3: Determine promoters and mechanisms of resilience that prevent or lessen disease severity
- Opportunity 2-4: Explore whether biopsychosocial precision medicine approaches to diseases and conditions in the NIDDK mission could identify unique sociobiological phenotypes

# **Resources for Research Teams**

# Guiding Principles for Embedding Equity, p. 11 Maintain a robust health disparities and health equity research portfolio Partner with diverse communities Include diverse populations in research Promote diverse perspectives in research Nurture a diverse, world-class research workforce Support appropriate consideration of race, ethnicity, and gender in research Promote transparency and accountability

#### Tips for Pursuing Competent Health Equity Research, p. 19





Define what is meant by health equity in the research plan. Select and tailor appropriate approaches.



Explain how the findings are expected to reduce health disparities and promote health equity.



Design a plan to communicate findings to patients, community members, and other relevant interested groups.

# **Reflections from Community Members**

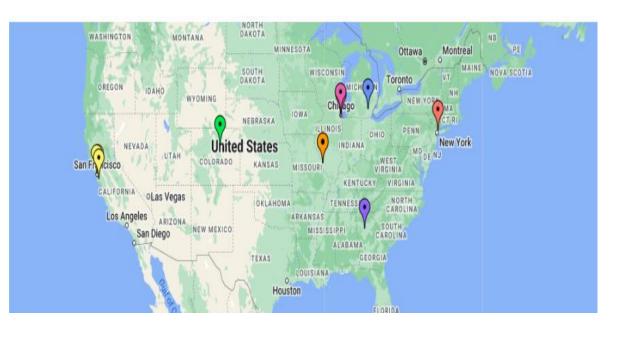
Community members hope that NIDDK-funded research will incorporate the community members' perspectives, ideas, and suggestions to help communities and provide a better health outcome.

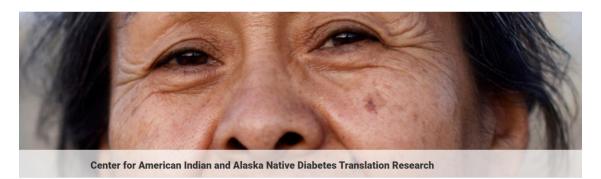
Being a part of this working group meant that my voice was heard. I feel as though I was able to advocate for people that look like me.

I believe participating in this group will facilitate change for us that feel we have been left behind.

> It made me feel proud and honored that my opinion was valued, and it made me want to go out and do research in the community to see what is missing or where we can help or fill the void to respond to the community's voice or the community's calling.

Moving Proven Therapies into Practice Centers for Diabetes Translational Research (P30)

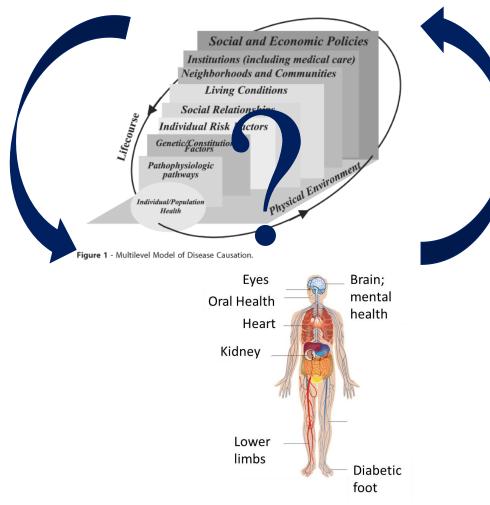






- Funded 7 CDTRs with 5-year awards (2021-2026)
- To translate evidence-based interventions to diverse clinical and community settings, and to grow investigator capacity in diabetes translation research and health equity
- National cores focus on eliminating disparities in diverse populations

Opportunities for Collaboration Treating the "Whole Person"



- Biological and Mechanistic research: to understand a biological or behavioral process, the pathophysiology of a disease
- Translational research: to understand beside to clinical practice and the community, dissemination and implementation science



National Institute of Diabetes and Digestive and Kidney Diseases

> Diabetes Research Centers (1973-2023)

# Diabetes Research Centers: 2025 and beyond! DEM Perspective

William T. Cefalu, M.D.

Director, Division of Diabetes, Endocrinology and Metabolic Diseases National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) National Institutes of Health (NIH) Bethesda, Md

May 31, 2023

www.niddk.nih.gov



National Institute of Diabetes and Digestive and Kidney Diseases



National Institute of Diabetes and Digestive and Kidney Diseases Diabetes Research Centers: 2025 and beyond!



Review of Diabetes Research Centers: Why now? For what purpose?

Rationale and Objectives
 Discuss Current Scientific Priorities
 Outline Process and Timeline

Diabetes Research Centers (1973-2023)

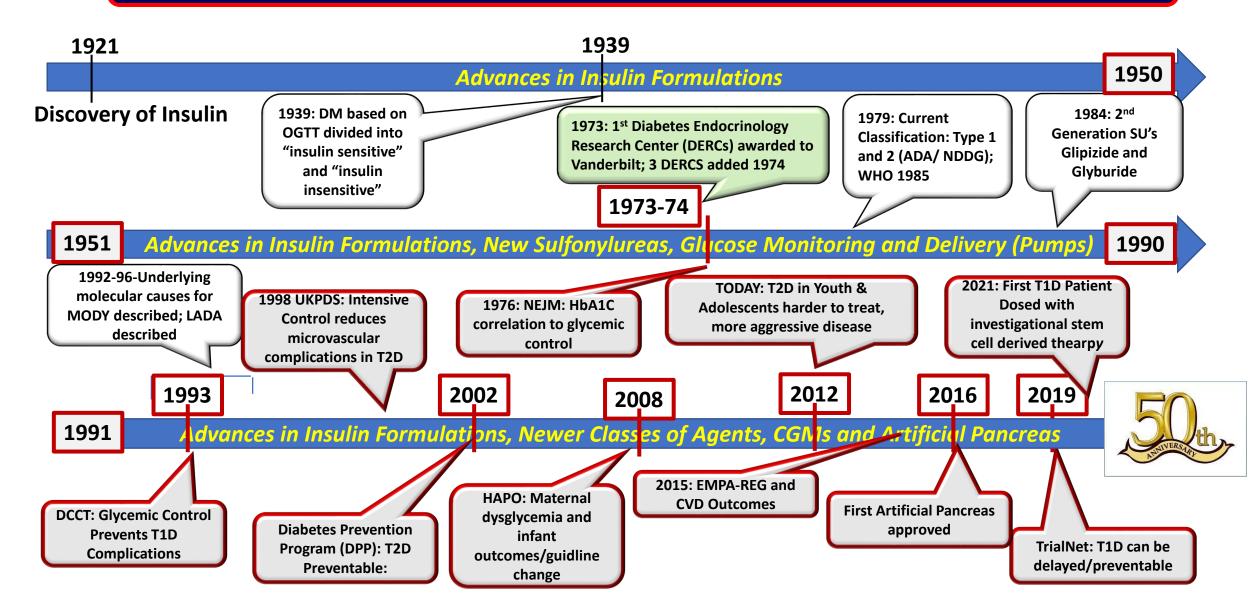


National Institute of Diabetes and Digestive and Kidney Diseases



- DRCs are one of the longest running programs of NIDDK
  - NIDDK's DRC program has served the diabetes research community extremely well!
  - Real challenges exist today that need to be addressed (e.g., critical mass and diversity of workforce, research funding, health disparities, burden, etc).
  - Pace of scientific discoveries continues to accelerate (How to best position the DRCs to respond?)

### **Advances in Diabetes Care**





#### > Ensure best practices continue:

- Continue to innovate
- Adapt to changing scientific priorities when appropriate
- Without periodic re-evaluation, any organization may risk missing out on growth opportunities (No review of <u>NIDDK's Centers Program</u> has been initiated in 11 years!)
- Ensure that DRCs have the right environment and infrastructure to achieve the mission and maintain the excellent productivity when moving forward.



### DRCs are one of the longest running programs of NIDDK

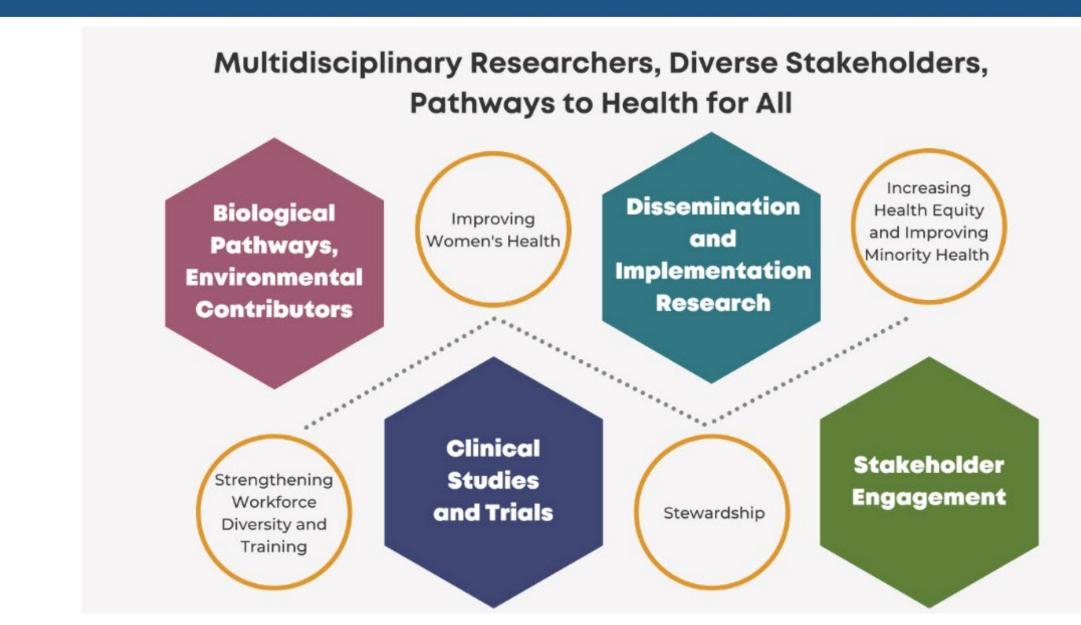
### Financial Commitment and Fiscal Stewardship of Available Funds

- Evaluation of how well DRCs address and align with NIDDK's strategic plan
- Evaluation of alignment with current and planned divisional initiatives



- > DRCs are one of the longest running programs of NIDDK
- Financial Commitment and Fiscal Stewardship of available funds
- Evaluation of how well DRCs address and align with NIDDK's new strategic plan
- Evaluation of alignment with current and planned divisional initiatives

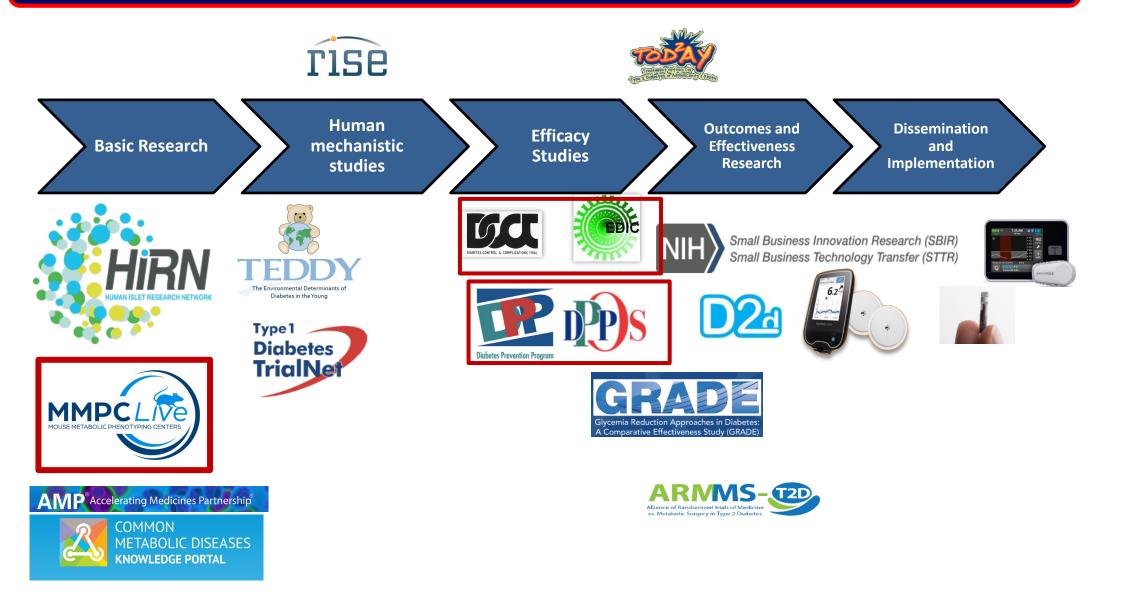
#### NIDDK Strategic Plan for Research



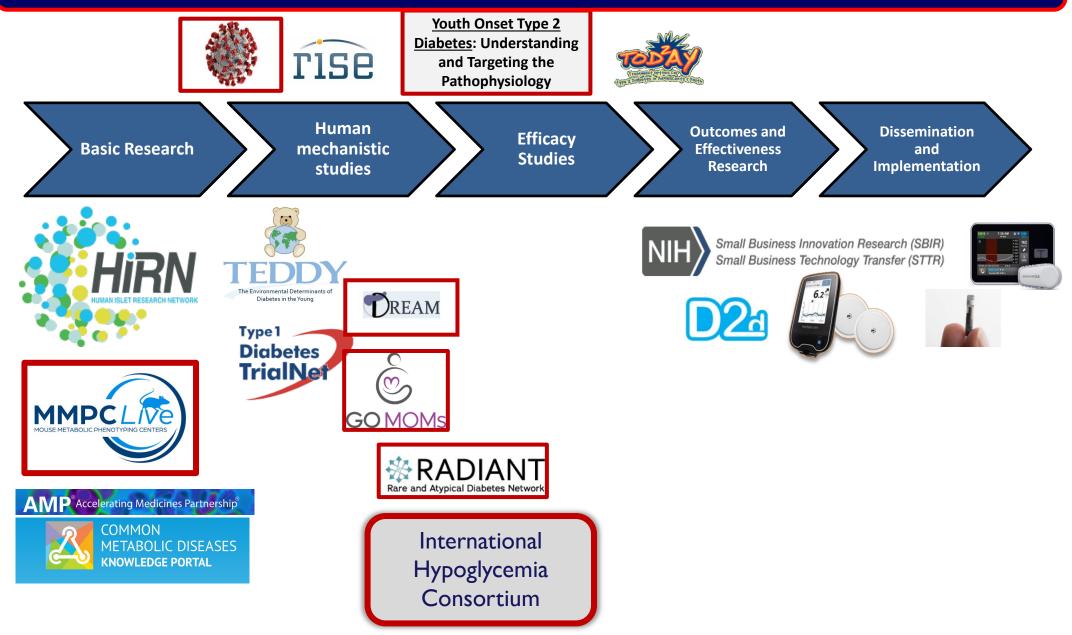


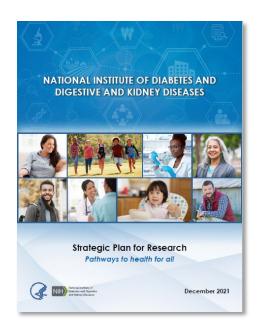
- DRCs are one of the longest running programs of NIDDK
- Financial Commitment and Fiscal Stewardship of Taxpayer dollars
- Evaluation of how well DRCs address and align with NIDDK's new strategic plan
- Evaluation of alignment with current and planned divisional initiatives

#### **NIDDK Funds All Stages of T1D/T2D Research**



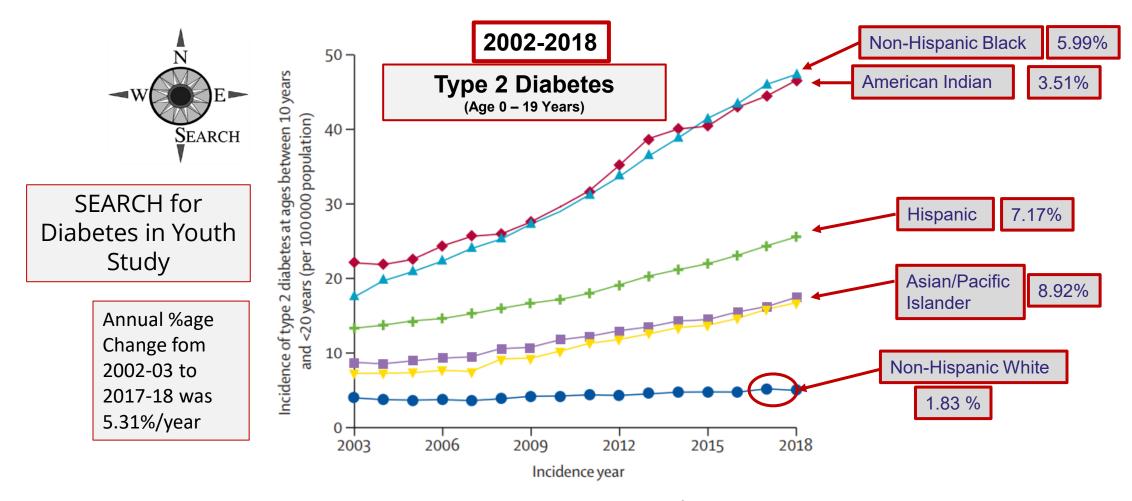
### "That was then, this is now!"



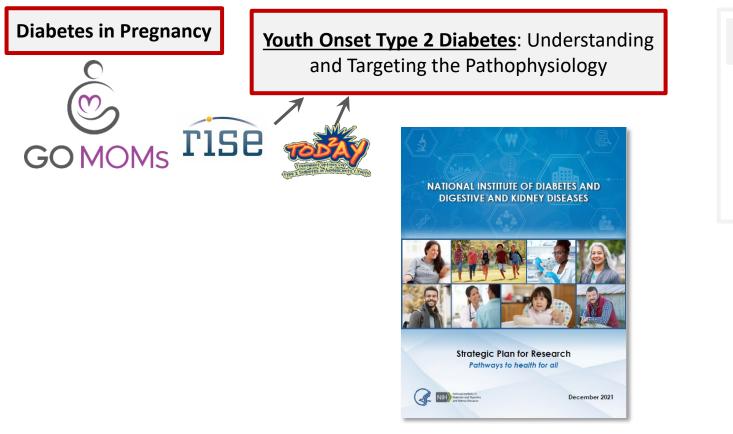




#### **Type 2 Diabetes is Increasing Among Youth and Adolescents**

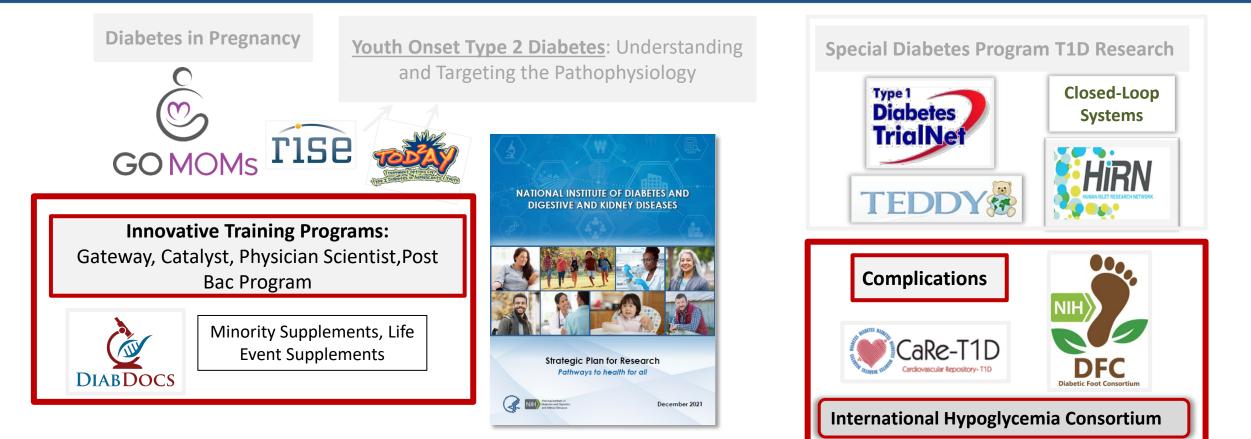


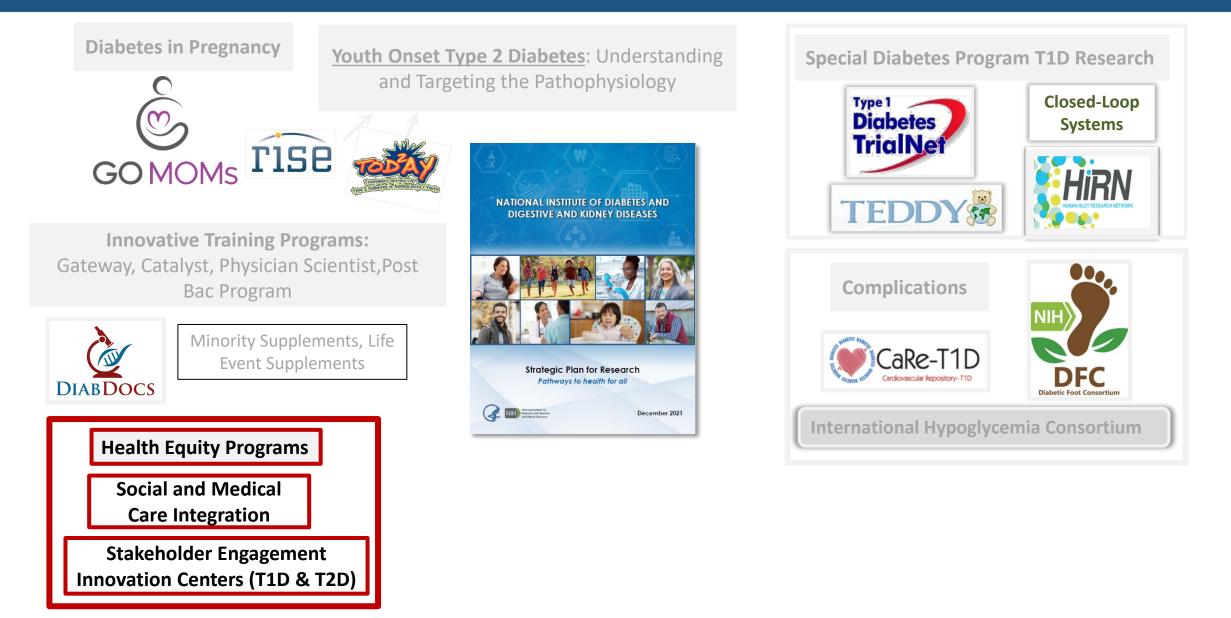
Wagenknecht, Lawrence, Isom et al. Trends in incidence of youth-onset type 1 and type 2 diabetes in the USA, 2002–18: results from the population-based SEARCH for Diabetes in Youth study. The Lancet Diabetes & Endocrinology DOI: 10.1016/S2213-8587(23)00025-6



Special Diabetes Program T1D Research







## Advancing Health Equity Diabetes Prevention and Treatment

#### Pilot Interventions to Integrate Social Care and Medical Care to Improve Health Equity

Applications Due: Oct. 2023

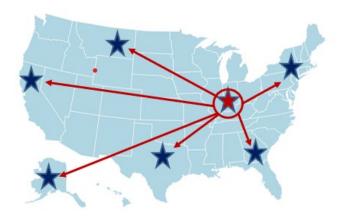
(<u>RFA-DK-22-038</u>)



#### National Engagement Innovation Center to Advance Health Equity in Type 2 Diabetes

Anticipated Award date: July 2023

(RFA-DK-22-001)



\*Sample geographic locations for illustrative purposes only

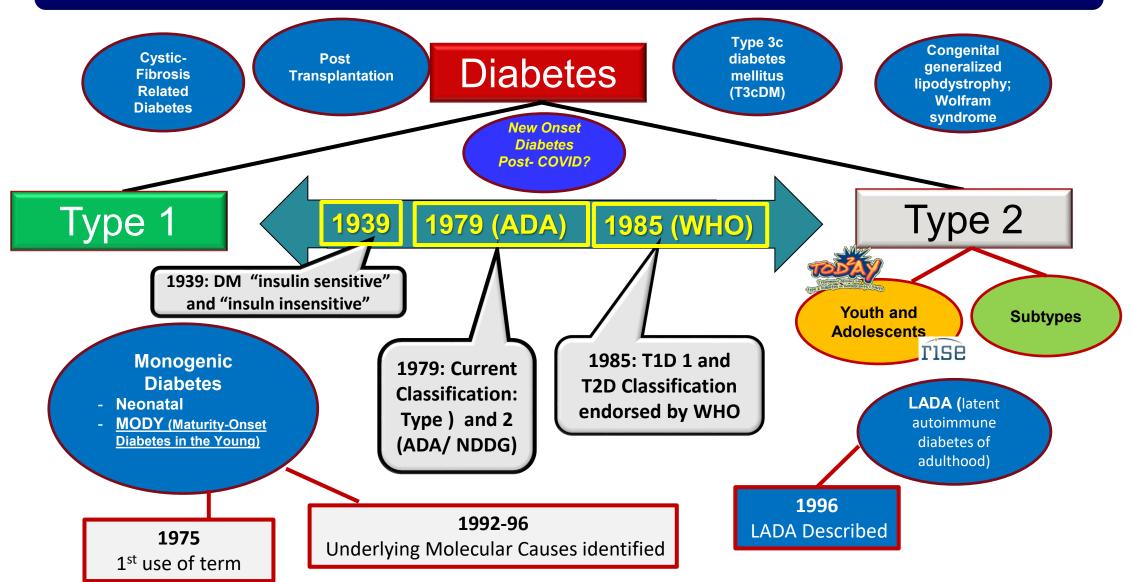


Example of Community Engagement Research Planning Meeting

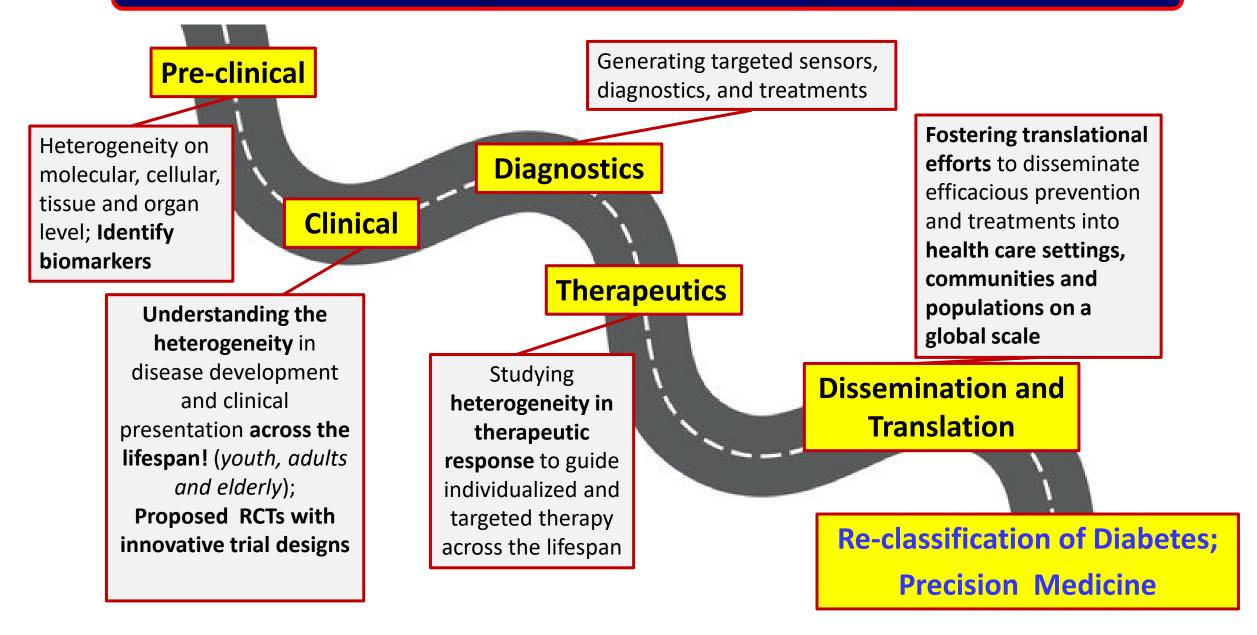
Image Credit: Meharry-Vanderbilt Community Engaged Research Core of the Vanderbilt Institute Clinical and Translational Science Award (CTSA) in 2009



### **Current Classification of Diabetes**



#### **Research Roadmap to Address Heterogeneity of Diabetes**



#### **NIDDK'S Working Group of Council**

## Strategic Plan to inform on Heterogeneity of Diabetes Research **<u>Charge of Working Group:</u>** To provide a <u>detailed overview of the current state</u> of knowledge on the heterogeneity of diabetes and inform NIDDK scientific staff of evolving concepts in this field from a global perspective **Composition:** Diversity of interests and scientific disciplines that would allow for a comprehensive assessment of the current and evolving state of the field **Expected Outcome:** Final Report outlining the needs of the field as well as the opportunities available that can be used to stimulate research efforts to develop more discrete definitions of subtypes of Type 2 diabetes

Re-classification of Diabetes; Precision Medicine



National Institute of Diabetes and Digestive and Kidney Diseases Diabetes Research Centers: 2025 and beyond!



Review of Diabetes Research Centers: Why now? For what purpose?

O Rationale and objectives
O Discuss current scientific priorities
O Outline Process and Timeline

Diabetes Research Centers (1973-2023)



National Institute of Diabetes and Digestive and Kidney Diseases

# Process for Developing a Strategy for the Future: 2025 and beyond

- Directors Meeting Spring 2023 Discussion:
  - Breakout groups: DRC Directors' input and vision

### • External Evaluation Panel Review (September 2023)

- Progress & accomplishments from each center
- <u>Outputs from today's session</u>: Vision; Synergy, Structure, Workforce, Cores
- Report provided to **Council** for feedback and comments

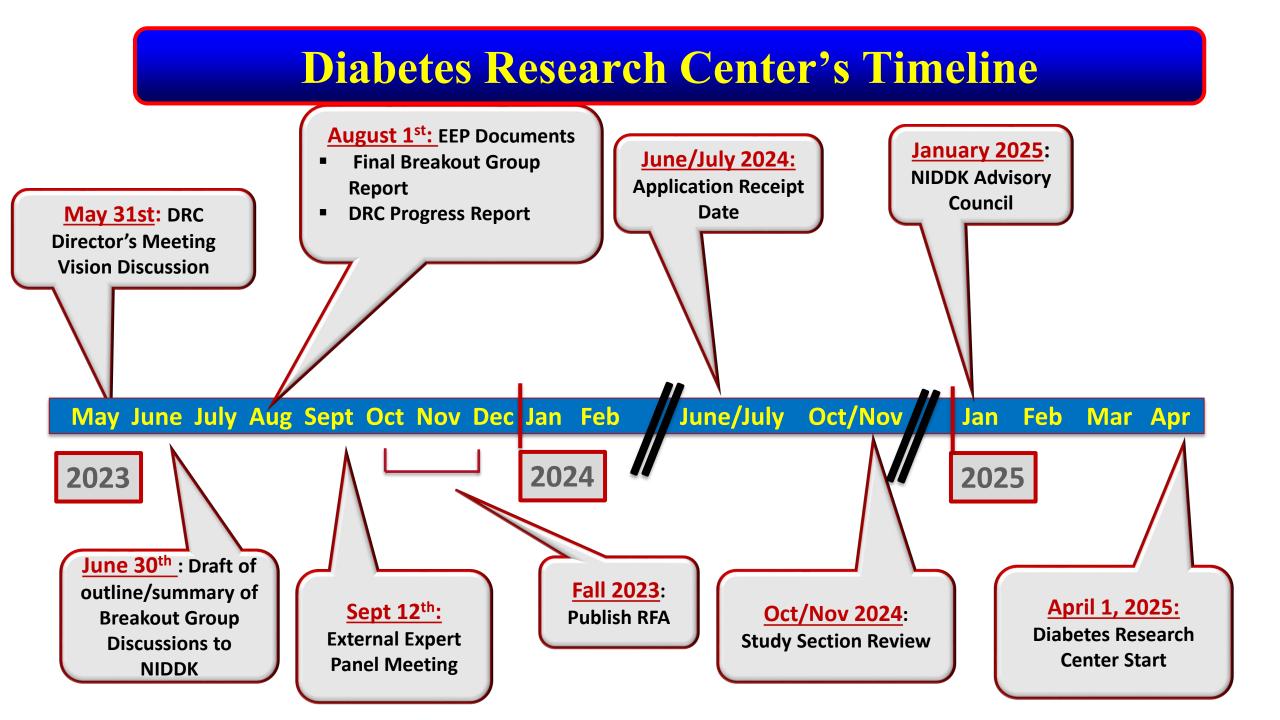
# Challenges for the Future: 2025 and beyond

### > Discussion Points for all Groups and input from all Center Directors

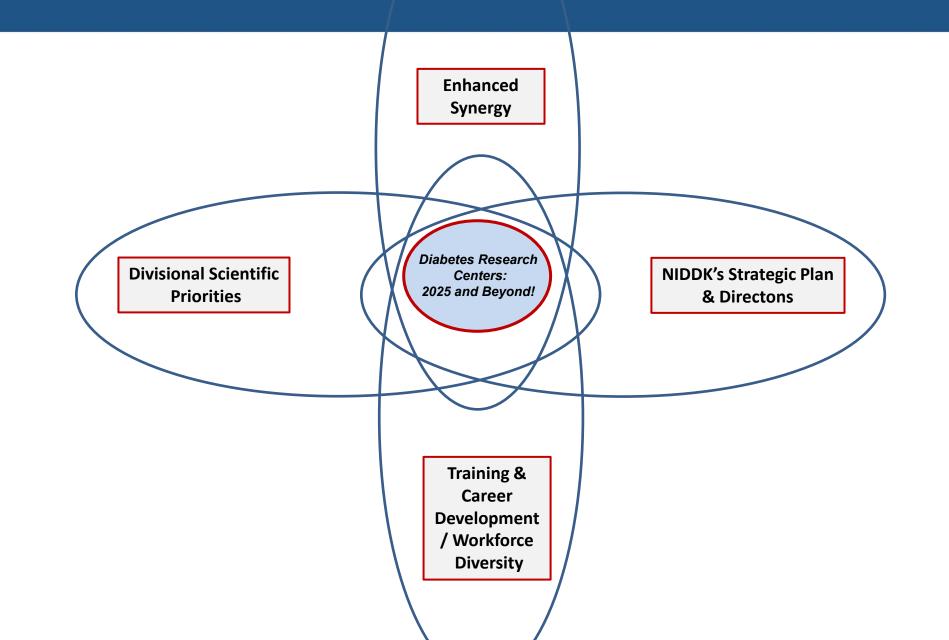
- What is your <u>vision</u> for the future of the Diabetes Research Centers?
- How do DRCs <u>align with the NIDDK Strategic Plan</u> and how best to transition to future priorities?
- What should be the emphasis and goals of the <u>new mission statement</u>?

### > Breakout Group Discussions

- Synergy
- DRC Structure
- Workforce
- Biomedical Cores



#### **Diabetes Research Centers: 2025 and beyond!**



## NIDDK Efforts to Recruit and Retain Physician Scientists in the Research Workforce

#### Lisa M. Spain, Ph.D.

Program Director National Institute of Diabetes and Digestive and Kidney Diseases National Institutes of Health

May 31, 2023



## Background/Need

- Physician scientists are an essential part of our biomedical workforce, providing a bridge from clinical need to research and back again\*
- Multiple disincentives: lengthy, intermittent training, research funding inherently unstable, financial pressures to perform higherpaid clinical work, family needs\*\*
- Late-bloomers: physician-scientists often get interested in research later (e.g., inspired by observations in clinic) and need to catch-up on research training. K awards allow MDs to catch up to PhDs in R01 grant success rates

\*Acad Med. 2018 Apr; 93(4): 565–573. doi: <u>10.1097/ACM.000000000001950</u>

\*\*Physician-scientists in the United States at 2020: Trends and concerns https://faseb.onlinelibrary.wiley.com/doi/full/10.1096/fj.202200327



## NIDDK Works to Help New Scientists Overcome Barriers

#### **Special Emphasis: Maximize payline**



## Loan Repayment Programs

- <u>NIH REACH</u> primarily for clinicians doing basic research
- Other LRP also specifically available for Clinical Researchers (L30), Pediatric Researchers (L40) or Health Disparities Researchers (L60)

DEM: Brad Cooke, Ph.D.

LRP https://www.lrp.nih.gov/



## DEM Emerging Physician Scientists Supplements to existing R01 awards

Renewal of Administrative Supplements to Support Emerging Physician Scientists to Develop Research Expertise May 2023 Council Concept Clearance Executive Summary

...we propose to renew a program to enable continuity of research experiences for licensed or board-eligible MDs or MD-equivalents engaged in clinical or basic research within the Division's mission.

Notice of Special Interest: Administrative Supplements to Support Emerging Physician-Scientists to Develop Research Expertise in Diabetes, Endocrinology and Metabolic Diseases Notice Number: NOT-DK-21-022





## National K12 Physician Scientist DiabDocs Program

https://med.stanford.edu/ped sendo/physician-scientistdiabdocs-k12-program.html



May Career Development Session: Wednesday, May 17, 2023, 10:30am-12pm (PT)/1:30-3pm (ET)

**Speaker:** Brittany Bruggeman, MD, Assistant Professor, Pediatric Endocrinology, UF Health Shands Children's Hospital

**Topic:** Do your little bit of good: a busy clinician's guide to everyday diabetes advocacy

**Speaker:** George Huntley, Chief Executive Officer, Diabetes Leadership Council

**Topic:** Understanding the broken US drug pricing system **Register in advance for this meeting:** 



## Transition to faculty: K awards

- K01– Ph.D. (non-clinical doctorate) proposing basic or clinical research
- K08 M.D. proposing basic research
- K23 M.D. proposing clinical research
- K25 doctorate in quantitative science, proposing biomedical research
- K99/R00 Pathway to Independence; only option available to non-US citizens

WARNING: READ FOA and follow links to IC-Specific Information



## Elements of a K proposal

- Candidate
- Career development plan
- Institutional commitment and sponsor's letters
- Mentoring team
- Research plan
- Other stuff—reference letters, SABV, RCR, animals, HS, budget, authentication plan, etc...



## K Award Program Contacts

#### Lisa M. Spain, Ph.D.

Program Director: <u>Division of Diabetes, Endocrinology, & Metabolic Diseases</u> Disease-modifying clinical trials in type 1 diabetes, etiology and pathogenesis of type 1 diabetes <u>lisa.spain@nih.gov</u> ; <u>301-451-9871</u>

#### Yan Li, Ph.D.

Program Director: <u>Division of Diabetes, Endocrinology, & Metabolic Diseases</u> Key regulators of intermediary metabolism; drug discovery; translational research; diabetic wound healing.

<u>yan.li5@nih.gov</u> ; 301-435-3721

Once awarded, regular Ks and K99 move to relevant scientific programs; visit NIDDK website to learn more about your Program Director

https://www.niddk.nih.gov/about-niddk/staff-directory/by-office/divisiondiabetes-endocrinology-metabolic-diseases



#### **Related Programs**

- Building Resources to Increase Diversity, Growth, Equity, and Scholarship (<u>BRIDGES</u>) <u>https://norccentral.org/bridges/</u>
- <u>Small R01s for emerging clinical trialists</u> to obtain preliminary data <u>https://grants.nih.gov/grants/guide/pa-</u> <u>files/PAS-23-086.html</u>
- <u>K26</u> (mentoring award) <u>https://grants.nih.gov/grants/guide/rfa-files/rfa-dk-22-012.html</u>



#### **Resources and Funding Opportunities For Training and Career Development DEM**

	<ul> <li>Parent F31: Predoctoral Individual Fellowship (PA-21-051)</li> <li>Parent F30: Individual Fellowship for MD/PhD Students (PA-21-049)</li> </ul>	Lineiging ritysiciali-	Parent K01: Research ( <u>PA-20-190</u> , A-20-176) Parent K08: Clinical Investigator Award ( <u>PA-20-203</u> )	Limited R03: Small Grant Program for	
NIH Intramural Summer Programs https://www.training.nih.gov /programs/sip	Medical Student Summer Research Program in Diabetes www.vumc.org/niddk Institutional Training Grant Supplements for Medical Students (NOT-DK-21-015) T35 Short term research award for medical students (PA-18- 404)	Loan Repayment L30, L4 L60, L70: https://www.lrp.nih.gov/	<ul> <li>Parent K23: Mentored Patient-Oriented Research Career Development Award (PA-20-205, PA-20-206)</li> <li>Parent K25: Mentored Quantitative Research Career Development</li> </ul>	NIDDK K01/K08/K23/K25 Recipients ( <u>PAR-22-129</u> )	
HS / UNDERGRAD	T32 Institutional National Research Service Award (NRSA) DEM (PA-18-403)         GRADUATE / MED SCHOOL       POSTDOC		K12: Clinical Scientist Institutional Career Development rogram Award DEM TRANSITION / JR FACULTY	Researchers from Diverse Backgrounds ( <u>RFA-DK-22-012</u> ) FACULTY / TENURED	



## NIDDK Office of Minority Health Research Coordination

- Provides additional support for scientists from groups under-represented in the clinical research enterprise
- Key personnel: Robert Rivers, PhD, Acting OMHRC Director (<u>robert.rivers@nih.gov</u>); Katrina Serrano, PhD, Program Director (<u>katrina.serrano@nih.gov</u>); Winnie Martinez, Program Director (<u>winnie.Martinez@nih.gov</u>)



#### **Resources and Funding Opportunities For DIVERSITY (Training and Career Development)**

Notice of NIH's Interest in Diversity https://grants.nih.gov/grants/guide/notice -files/NOT-OD-20-031.html		Mentoring & Networking Resources: Network of Minority Health Research Investigators (NMRI)				
		Bringing Resources to Increase Diversity, Growth, Excellence, and Scholarship (BRIDGES)				
Short-Term Research Experience Program to Unlock Potential (STEP-UP)		Helping to Accelerate Research Potential (HARP) R25 NIDDK Partnerships with Professional Societies (RFA-DK-22-004)				
NIDDK Diversity Summer Research Training Program (DSRTP)	SRTP) Medical Student Research Program in Diabetes www.vumc.org/niddk		National Medical Association (NMA) and National Hispanic Medical Association (NHMA)Travel Awards K99/R00: MOSAIC (PAR-21-271) HEAL (RFA-NS-		<b>K26:</b> NIDDK Investigator Award to Support Mentoring of Early Career Researchers from Diverse Backgrounds ( <u>RFA-DK-22-012</u> )	
Aspirnaut <sup>™</sup> Summer Research Internships www.aspirnaut.org Besearch Supplements to Pro	Institutional Training Grant Supp <u>NOT-DK-21-016</u> ) mote Diversity in Health-Related Reso	22-025) Training Grant Supplements (T32 & TL1, Health-Related Research (PA-21-071)			R21: Small Grants for New Investigators to Promote Diversity in Health-Related Research (PAP-21, 212)	
HS / UNDERGRAD	GRADUATE / MED SCHOOL		STDOC	TRANSITION	( <u>PAR-21-313</u> ) / <b>JR FACULTY</b>	FACULTY / TENUF





## National Institute of Diabetes and Digestive and Kidney Diseases

National Institute of Diabetes and Digestive and Kidney Diseases

## www.niddk.nih.gov





## NIDDK Medical Student Research Program in Diabetes

- 15th summer (2009-2023)
  - Virtual programs in 2020 and 2021
- 4-10 students at each Diabetes Center
- Over 1400 students from >140 medical schools
- Funding
  - Supplement to T32s at Diabetes Centers
  - T35's at Vanderbilt and Maryland





#### Access to careers in discovery





## **DK-MSRP Outreach and Application**

(nearly all US medical students hear about the program)

#### November



#### February-March

- Students apply and select 2 Diabetes Research Centers
- Each Center reviews and lists students
- "Matching" of students/centers

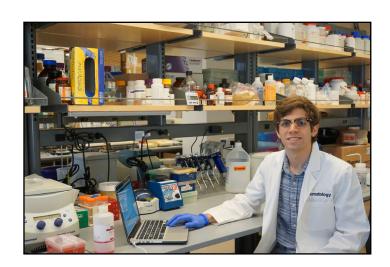
- Recruit: focus on diversity
  - Deans of US Medical schools (141 MD programs, 34 DO) 35% email
  - AAMC email (~1500 individuals)
  - National Hispanic Medical Association
  - Association of Native American Medical Students
  - Electronic / Web site / Twitter / MyNRMN 40%
  - Word-of-mouth from prior participants 20%



## NIDDK Medical Student Research Program - Summer 2022

#### May - June - July

- 8-12 weeks of research
- Diabetes/research seminars (web-based)



#### August

- Research symposium all attend
- Poster presentations (3)
- Visiting professors





## **NIDDK Student Symposium**

- Moderated Poster Sessions x3
  - 8-12 students with visiting professors
- Career Next Steps
  - Art Castle, PhD (NIH/NIDDK)
  - Residency program directors and physician-scientist program directors from Med and Peds

- Career paths: from 32 Visiting professors 2012-2022 (connecting the DRCs)
  - Rochelle Naylor, MD (Chicago)
  - Andrea Ramirez MD (NIH)
  - Mary Elizabeth Patti MD (Harvard)
  - Raymond E. Soccio, MD PhD (Penn)
  - Steven Kahn MD (UW)
  - Carmella Evans-Molina, MD, PhD (IU)



## **Demographics in 2022**

## Goal: A diverse workforce, but having a harder time recruiting despite more outreach \*

Student Participant Demographics 2018		Student Participant Demographics 2023		US Medical School Enrollment 2023-24	
Race		Race		Race	
African American	22 (17%)	African American	4 (7%)	African American	5,043 (9%)
American Indian	1 (<1%)	American Indian	1 (2%)	American Indian	390 (1%)
Asian	39 (39%)	Asian	30 (53%)	Asian	14,012 (26%)
Caucasian	46 (35%)	Caucasian	15 (26%)	Caucasian	23,558 (45%)
Hispanic	13 (10%)	Hispanic	3 (5%)	Hispanic	5,629 (11%)
Native Hawaiian or Pacific Islander	2 (1%)	Native Hawaiian or Pacific Islander	0 (0%)	Native Hawaiian or Pacific Islander	52 (0.1%)
Other/ multiple race/ unknown/ no answer	8 (6%)	Other/ multiple race/ unknown/ no answer	4 (7%)	Other/ multiple race/ unknown/ no answer	4,215 (8%)

Gender		Gender		Gender	
Female	42 (74%)	Female	42 (74%)	Female	29,827 (56%)
Male	15 (26%)	Male	15 (26%)	Male	23,072 (44%)

\*There may be cost of living / stipend issues that impact some students



## Schools with a Summer Semester <7 weeks cannot apply



Stanford University

**Harvard University** 

#### Vanderbilt University



SCHOOL OF MEDICINE VANDERBILT UNIVERSITY

University of Washington



**University of Michigan** 

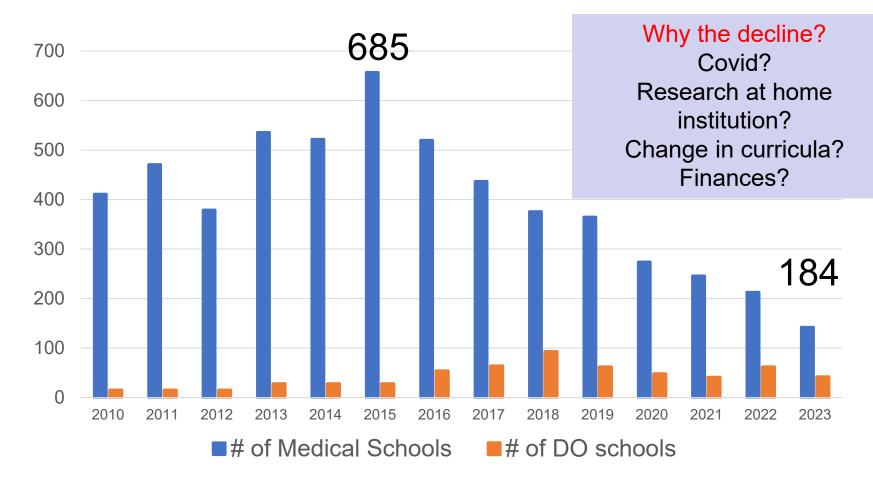




Of the Diabetes Research Centers, 5 of the 17 are at medical schools where their students cannot apply

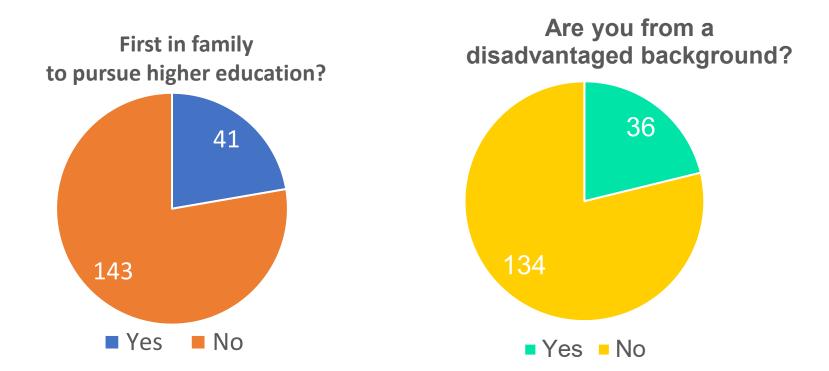
<10% of students come from medical schools affiliated with DRCs

#### Applicants from MD or DO Schools a steady decline in applicants



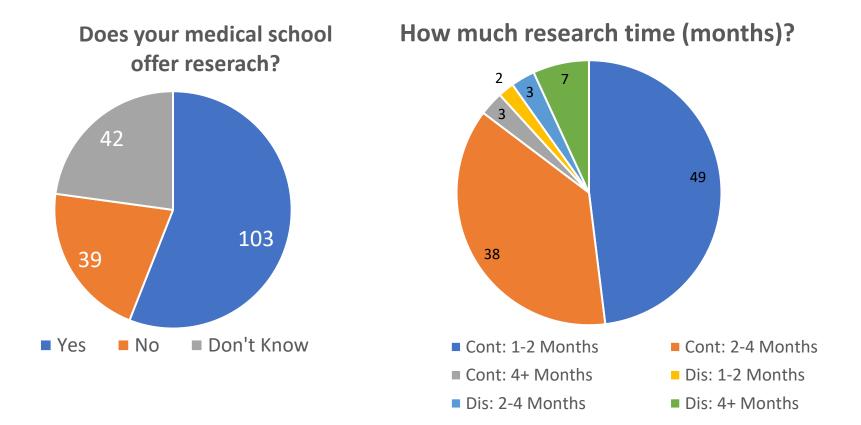


## **Information about our applicants**





## Information about their medical schools





## **Positive Outcomes / Innovations**

- >75% "...more likely to pursue research in their career..."
- > 95% would recommend to other students at their school
- 42% matched in medicine or pediatrics (32% US average)
- ~50% present their summer research in another forum
- ~ 60% complete another research experience during medical school
- ~30 students took a year off to pursue in-depth research
- Database to follow students and provide assistance with next steps in career
- Ways to increase flexibility for participants
- Measures to Enhance Diversity
- AIM-Ahead Artificial Intelligence/Machine Learning Consortium to Advance Health Equity and Researcher Diversity.





*Toufeeq Ahmed, PhD* Director of Education Informatics, Vanderbilt University

# Challenges in the physician-scientist pipeline (Thurs July 27)

We'd love to have one participant from each DRC participate in the NIDDK-MSRP research symposium July 25-26

- NIDDK leadership perspectives (Dr. Rodgers)
- DiabDoc program (NIDDK) Linda DiMeglio -IU
- Role of P&F programs in career development
- How can we adapt the medical student research program? (remote projects, discontinuous, long-term follow-up).
- Diversity in the workforce. Toufeeq Ahmed AIM-Ahead -Advancing Health Equity and Researcher Diversity
- Morning sessions about above, break out groups, report back to team, adjourn by 2:30pm



## **Items for Discussion**

- Significantly fewer applicants
- Many medical schools have new curriculum with little or no summer break
- Few applicants from medical schools with DRCs
- Shift in student interest from wet-lab interest
- Ways to expand virtual / hybrid projects
- How to enhance diversity in the pipeline
  - Ways to include lower income students with limited availability to travel





## Data Management and Sharing dkNET Resources

Jeffrey S. Grethe, Ph.D.

PI, NIDDK Information Network (dkNET)

Co-Director, FAIR Data Informatics Laboratory, UCSD







## **DMSP Policy Details**

#### What

- Defines Scientific Data as: "The recorded factual material commonly accepted in the scientific community as of sufficient quality to validate and replicate research findings, regardless of whether the data are used to support scholarly publications. Scientific data <u>do not include</u> laboratory notebooks, preliminary analyses, completed case report forms, drafts of scientific papers, plans for future research, peer reviews, communications with colleagues, or physical objects, such as laboratory specimens."
- Even those scientific data not used to support a publication are considered scientific data and within the final DMS Policy's scope

#### When

- "[s]hared scientific data should be made accessible as soon as possible, and no later than the time of an associated publication, or the end of the award/support period, whichever comes first."
- Researchers may share data underlying publication during the period of award but may share other data that have not yet led to a publication by the end of the award period.

#### Where

• Encourages the use of established repositories to the extent possible.

#### **An NIDDK Resource**





### **DMSP Policy Details**

#### How

• NIH encourages data management and data sharing practices consistent with the FAIR data principles

#### Funding

• Fees for long-term data preservation and sharing are allowable, but funds for these activities must be spent during the performance period, even for scientific data and metadata preserved and shared beyond the award period.

#### Repercussions

• After the end of the funding period, non-compliance with the NIH ICO-approved Plan may be taken into account by NIH for future funding decisions for the recipient institution

The DMS Policy applies to all research, funded or conducted in whole or in part by NIH, that results in the generation of scientific data. This includes research funded or conducted by extramural grants, contracts, Intramural Research Projects, or other funding agreements regardless of NIH funding level or funding mechanism.

#### **An NIDDK Resource**

#### dknet.org



#### Good data management is the gateway to data sharing

	Ad Hoc	One-Time	Active and Informative	Optimized for Re-Use
Planning your project	When it comes to my data, I have a "way of doing things" but no standard or documented plans.	I create some formal plans about how I will manage my data at the start of a project, but I generally don't refer back to them.	I develop detailed plans about how I will manage my data that I actively revisit and revise over the course of a project.	I have created plans for managing my data that are designed to streamline its future use by myself or others.
Organizing your data	I don't follow a consistent approach for keeping my data organized, so it often takes time to find things.	I have an approach for organizing my data, but I only put it into action after my project is complete.	I have an approach for organizing my data that I implement prospectively, but it not necessarily standardized.	I organize my data so that others can navigate, understand, and use it without me being present.
Saving and backing up your data	I decide what data is important while I am working on it and typically save it in a single location.	I know what data needs to be saved and I back it up after I'm done working on it to reduce the risk of loss.	I have a system for regularly saving important data while I am working on it. I have multiple backups.	I save my data in a manner and location designed maximize opportunities for re-use by myself and others.

Borghi J, Abrams S, Lowenberg D, Simms S, Chodacki J (2018) Support Your Data: A Research Data Management Guide for Researchers. Research Ideas and Outcomes 4: e26439. https://doi.org/10.3897/rio.4.e26439



#### Changing the culture around data management and sharing

#### Science and Society

- Transparency
- Reproducibility
- Reduced waste
- Driving discovery

#### • Future me

- One most likely to benefit from good data management and sharing through stable archives
- No one ever regretted annotating too much

- Me
  - Answer to the underpowered study
  - Data sharing and good data management are closely aligned
  - Compliance with mandates
  - Credit for the totality of my work

#### My colleagues (and PI)

- Easy to engage with colleagues over well annotated data and associated code
- What happens when the post doc leaves?

#### **An NIDDK Resource**

April 28029, 2021; National Academies of Science Workshop

#### dknet.org



#### Data as a Research Product

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- 1. Data should be considered *legitimate, citable products of research*. Data citations should be accorded the same importance in the scholarly record as citations of other research objects, such as publications.
- 2. Data citations should facilitate giving scholarly credit and normative and legal attribution to all contributors to the data, recognizing that a single style or mechanism of attribution may not be applicable to all data.
- 3. In scholarly literature, whenever and wherever a claim relies upon data, the corresponding data should be cited.



https://www.force11.org/group/joint-declarationdata-citation-principles-final





## But how do I do that?

- "NIH encourages data management and data sharing practices consistent with the FAIR data principles."
- "NIH strongly encourages the use of established repositories to the extent possible for preserving and sharing scientific data"





#### **Connecting Researchers to Resources**

# ANIDDK RESOURCE



# What is dkNET?

- dkNET provides a single point of access to information about diverse research resources, including data, information, materials, tools, funding opportunities, literature, services, events, news, and projects that advance the mission of the NIDDK.
- dkNET provides tools and services in support of rigor and reproducibility, built around the Research Resource Identifier (RRID) and the FAIR data principles (Findable, Accessible, Interoperable, Re-usable).

# https://dknet.org

### An NIDDK Resource





### Access to the DMSP Resources: Https://dknet.org



Have questions or need help? Join dkNET Office Hour Friday, March 3, 2023 11 am - 12 pm PT

New NIH Data Management & Sharing Plan



.org

ling Liu, PhD. Assistant Professor, Department of Physics

**dkNET** Webinar Series

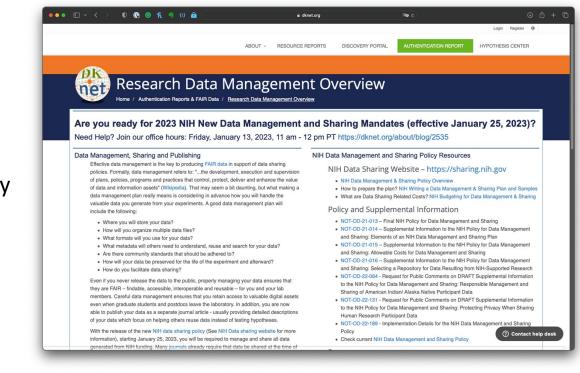
diana University-Purdue University Indianano



# **Research Data Management Overview**

### Provide information about:

- What is research data management?
- Provide links to resource, such as California Digital Library data management planning tool
- Provide specificity for DK applications



dknet.org

### **An NIDDK Resource**



# Think about where your data will end up in the beginning

Best practice: Submit your data to repository specialized for your type of data or your domain

...if there isn't one, then there are also general purpose repositories available







 $\langle | \rangle$ 

# Where Can I Deposit My Data?

- List of DK relevant repositories, recommended by NLM and various journals
- Created in conjunction
   with NIDDK

- FAIR Standards
- Clinical Repositories
   Information
- Data maintenance
- Data size limit and cost
- Dynamic database

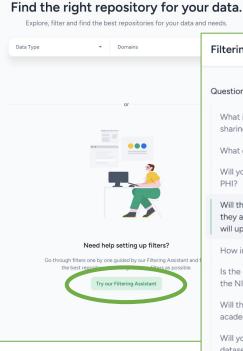
		Functional Genomic	CS			
		Repository Name	RRID	Description	Type of Data	Recommended By
Home / Suggested data reposito		ArrayExpress	RRID:SCR_002964 🔇	International functional genomics data collection generated from microarray or next-generation sequencing (NGS) platforms. Repository of functional genomics data supporting publications. Prov[more]	Microarray; next- generation sequencing (NGS)	NIDDK
here can I deposit my dat have organized a list of data repositorie M NIH Data Sharing Repositories, Scier	es that are recor	Biological General Repository for Interaction Datasets (BioGRID)	RRID:SCR_007393 🔮	Curated protein-protein and genetic interaction repository of raw protein and genetic interactions from major model organism species, with data compiled through comprehensive curation efforts.	Molecular interaction data	NLM, NIDDK
e is available, or into an institutional or g • NIDDK-specific repositories • NIH-supported repositories • Institutional repository • Other NIDDK Project-specific or cons		Database of Interacting Proteins (DIP)	RRID:SCR_003167 😋	Database to catalog experimentally determined interactions between proteins combining information from a variety of sources to create a single, consistent set of protein-protein interactions[more]	Protein interaction data	NLM, NIDDK
scientific disciplines		Gene Expression Omnibus (GEO)	RRID:SCR_005012	Functional genomics data repository supporting MIAME- compliant data submissions. Includes microarray-based	Microarray; next- generation sequencing	NLM, NIDDK
Repository Name	RRID	Descri	iption	Ту	pe of Data	Recomme
Dataverse Network Project		researce for creating		protocols, and community connections	research data	NIDDK
Project 🔾	~~~					

### An NIDDK Resource



# **Repository Wizard**

- Rated 80 repositories against FAIR, Open, Trustworthy, **Citable principles** and other criteria
- Wizard guides a user through criteria that may be important for selection
- Scheduled for • release summer of 2023





### Questions

What is the data type you will be sharing?

What domain do the data belong to?

Will you be sharing human data with PHI?

Will the data be updated frequently, i.e., they are part of an ongoing study that will uploaded in batches?

How important is data citation to you?

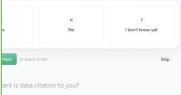
Is the dataset funded, at least in part, by the NIH?

Will the dataset support any published academic work?

Will you need a PID for the published dataset?



a be updated frequently, i.e., they are part of an ongoing vill uploaded in batches?



	00			
11	09			
	Somewi	hat	Crucial	
funded a	at least in part,	by the NIH?		
c runaca, c	at rouse in part,	by the run .		
Ver	, by an NIDDK	Yes, by an NIH	Yes, by another	

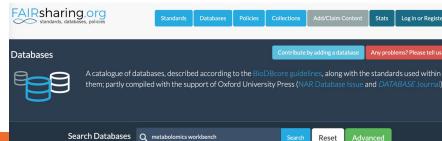
### dknet.org

### **An NIDDK Resource**



# What standards should I use?

- Repositories often enforce specific standards for metadata and data
- Thinking about where your data will end up before you start your experiments will help you determine how to collect, annotate and organize your (meta)data
- <u>Fairsharing.org</u> maintains a database of standards and policies across biomedicine



lame	RRID	Description	Type of Data	Submitting Data	Accessing Data	Guidelines/Standards	Recommended by
<u>855</u>	RRID:SCR_002964	Archive of Functional Genomics Data stores data from high-throughput functional genomics experiments, and provides these data for reuse to the research community.	Microarray; next- generation sequencing (NGS)	How to submit to ArrayExpress	How to access ArrayExpress Data	MIAME standard for microarray data.	NIDDK; Nature Scientific Data; PLOS; Science
<u>General</u> <u>for</u> Datasets	RRID:SCR 007393	BioGRID is a curated biological database of protein- protein interactions, genetic interactions, chemical interactions, and post-transitional modifications from major model organism species. All interaction data are freely provided through our search index and available via download in a wide variety of standardized formats.	Molecular interaction data	How to submit data to BioGRID	How to access BioGRID data	Molecular interaction data should be deposited with a member of the International Molecular Exchange Consortium (IMEx), following the MIMIx recommendations	NIDDK; Nature Scientific Data; PLOS
ase of types and otypes aP)	RRID:SCR_002709	The database of Genotypes and Phenotypes (dbGaP) was developed to archive and distribute the data and results from studies that have investigated the interaction of genotype and phenotype in Humans.	Genotyping an phenotyping information in human subject	Functiona	FGE Genomics Data S	D	
abase of racting Proteins ?)	RRID:SCR_003167	DIP catalogs experimentally determined interactions between proteins. It combines information from a variety of sources to create a single, consistent set of protein-protein interactions.	Protein interaci data	Home About Us	Mission Project		
<u>te Expression</u> nibus (GEO)	RRID:SCR_007303	Gene Expression Omnibus is a public functional genomics data repository supporting MLME-compilant submissions of array- and sequence-based data. Toola are provided to help users query and download experiments and curated gene expression profiles.	Microarray: ne: generation sequencing (N	Minimum Inf	ne Minimum Inform e interpretation of ti	ation About a Microarray e results of the experiment un (Brazma et al. (2001). Nature	xperiment that is nambiguously and
		genomics data repository supporting MIAME-compliant submissions of array- and sequence-based data. Tools are provided to help users query and download	Microarray: ne: generation sequencing (N	Minimum Inf MIAME describes th needed to enable the potentially to reprod	ne Minimum Inform e interpretation of th uce the experiment	ation About a Microarray Experiment un	xperiment that is nambiguously and



# Access, Distribution, or Reuse Considerations

- Informed consent
- Privacy and confidentiality protections
- Whether access to scientific data derived from humans will be controlled
- Any restrictions imposed by federal, Tribal, or state laws, regulations, or policies, or existing or anticipated agreements
- Any other considerations that may limit the extent of data sharing.



Adapted from Ghosh et al. 2022

dknet.org

### **An NIDDK Resource**



# **Outreach to Next Generation Researchers**



### dkNET Summer of Data Student Program

Program Duration: 6 weeks

### After this program, students will be able to:

- Utilize dkNET tools and resources in research projects
- Gain familiarity with additional tools to help their research, e.g., protocols.io, ORCID, Slack
  - Understand best practices for robust and reproducible research
- Understand the basics of good data management for FAIR data https://dknet.org/about/Summer-Program

### **An NIDDK Resource**



### Highlight Repositories at Webinar Series



### **An NIDDK Resource**



DK

# **Office Hours**



Looking for data repository for your data management or data sharing plan? dkNET can help. Simply fill in some basic information below to get started!

### An NIDDK Resource



### **Frequently Asked Questions from Office Hours**



### Frequently Asked Questions

Q1: Where can I find resources about data management and sharing plans?

A: You can go to <u>dkNET's data management and sharing webpage</u>. We list resources including policies, webinar recordings, slides, and samples. NIDDK also has <u>a resource related to data management of sharing</u>.

Q2: Where can I see the slides and recording of the presentation in dkNET's data management and sharing office hours?

A: You can find slide and recording information here: <u>https://dknet.org/about/blog/2535</u>. Slides are <u>shared via Slideshare</u> and videos are <u>shared via Youtube</u>.

Q3: If we publish data such as in a paper or pre-print (e.g. bioRxiv), does this count as having shared the data? Does the data need to be in a repository?

A: A table or figure included in a manuscript does not count as sharing the data. You still need to share the underlying data (e.g. spreadsheet) and the appropriate metadata and data dictionary. If there is original data that leads to a table or figure (e.g. data extracted from images), this data would also need to be shared in an appropriate repository.
Q4: If we collect clinical data in our institution-level repositories, does this count as having shared the data?

A: This depends on what you mean by your institutional-level repository. For clinical data many institutes provide an institutional access to tools to collect clinical data (e.g. RedCap). The data in these institutional repositories are not typically used for data publication and sharing and the data would need to be exported and transferred to an appropriate repository.

An NIDDK Resource

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dknet.org
```





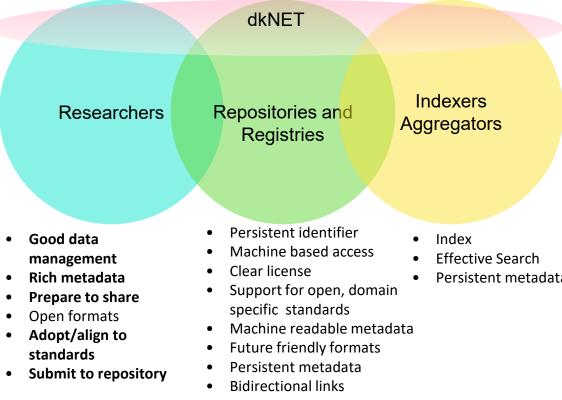
# **OVERWHELMED?**

When you're waist-deep in tribbles, it's a bit difficult to remember that your original objective was to guard the quadrotriticale.

An NIDDK Resource



# FAIR Partnership



### Data citation ٠

Persistent metadata

### **An NIDDK Resource**





**An NIDDK Resource** 



# **Resources Summary**

- dkNET portal: <u>https://dknet.org</u>
- Data Management and Sharing Plan resources
  - Research Data Management webpage: <u>https://dknet.org/rin/research-data-management</u>
  - Suggested Data Repositories: <u>https://dknet.org/rin/suggested-data-repositories</u>
  - FAQ webpage: <u>https://dknet.org/about/office-hours-faq</u>

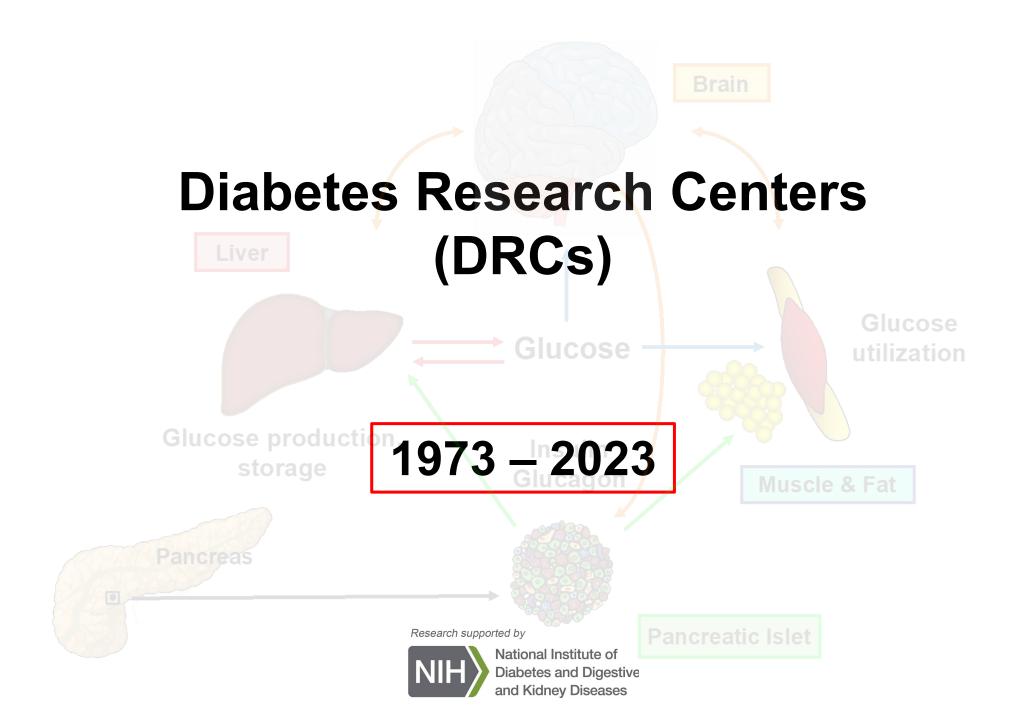
### • Training resources

- Summer of Data Student Program: <u>https://dknet.org/about/Summer-Program</u>
- dkNET Webinar Series: <u>https://dknet.org/about/webinar</u>
- On-demand webinar: <a href="https://dknet.org/about/webinar1">https://dknet.org/about/webinar1</a>
- YouTube channel: <u>https://www.youtube.com/channel/UCwukSrB8L61Fhwjv3x20IOQ</u>

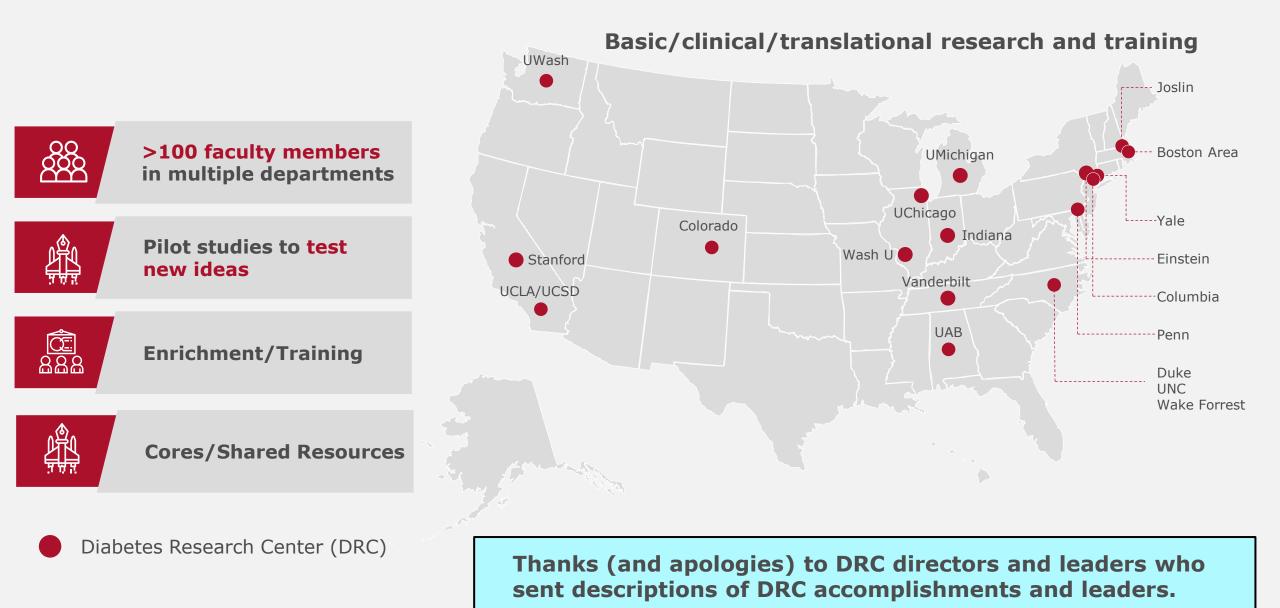
dknet.org

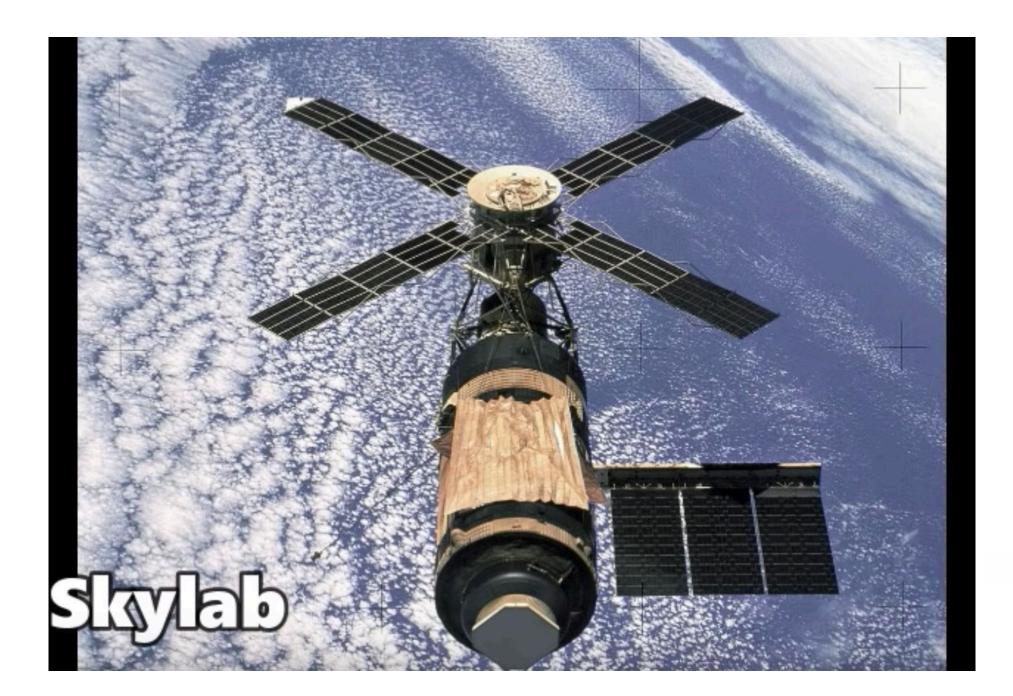
- Slideshare: <u>https://www.slideshare.net/dkNET/presentations</u>
- Join the community and keep up with the latest
  - Newsletter <u>https://dknet.org/about/maillist</u>
  - Twitter <a href="https://twitter.com/dkNET\_Info">https://twitter.com/dkNET\_Info</a>
  - Facebook <u>https://www.facebook.com/dkNET.org</u>

### **An NIDDK Resource**



# **NIDDK Diabetes Research Centers**





1973



# Watergate hearings Full screen (f)

- Production of monoclonal antibodies described.
- Term "dendritic cell" is coined.
- American Psychiatric Association declares that homosexuality is not a mental disorder.
- Endangered Species Act signed into law.

- Historical overview and evolution of NIDDK-funded Diabetes Research Centers (DRC)
- DRCs: catalyst for:
  - Discovery
  - Innovation
  - Infrastructure and team science
  - Training

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  - Training
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  - Connections, collaboration, and continuity
  - It takes a village (funding, advocacy, politics, research, many types of expertise...)

- Historical overview and evolution of NIDDK-funded Diabetes Research Centers (DRC)
- DRCs: catalyst for:
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  - Innovation
  - Infrastructure and team science
  - Training

### It takes a noble man to plant a seed for a tree that will someday give shade to people he may never meet.

D. Elton Trueblood

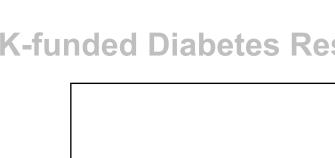
American Quaker author and theologian, chaplain at Harvard and Stanford (1900-1994)

- DRCs: impact at an institution, across institutions, and in science
- Themes to "hear" today:
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  - It takes a village (funding, advocacy, politics, research, many types of expertise...)
  - Past efforts reverberate over many years and may take many years (planting a seed...)

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Today

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  - One thing leads to another that leads to another, that leads to another... (Dominos)





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  - Rising water lifts all boats

# **People (and research programs) are like boats....**



Wikipedia

Bay of Fundy, New Brunswick at high and low tide; Tidal range - 56 feet

# **People (and research programs) are like boats....**



Wikipedia

Diabetes Research Centers raise the water level for individuals, for grants, for training (graduate students, medical students, postdoctoral fellows), and for faculty

Bay of Fundy, New Brunswick at high and low tide; Tidal range - 56 feet

# **Genesis of Diabetes Research Center Program**

Congressional hearings about diabetes research

# **Genesis of Diabetes Research Center Program**

### Congressional hearings about diabetes research

1. LI12: Nal dia 973 **MATIONAL DIABETES RESEARCH AND EDUCATION ACT. 1973** \_\_\_\_\_ 3-1 HEARING BEFORE THE SUBCOMMITTEE ON HEALTH OF THE COMMITTEE ON LABOR AND PUBLIC WELFARE UNITED STATES SENATE NINETY-THIRD CONGRESS FIRST SESSION ON S. 17 TO AMEND THE PUBLIC HEALTH SERVICE ACT TO PROVIDE FOR GREATER AND MORE EFFECTIVE EFFORTS IN RESEARCH AND PUBLIC EDUCATION WITH REGARD TO DIABETES MELLITUS S. 648 TO AMEND THE PUBLIC HEALTH SERVICE ACT TO EXPAND THE AUTHORITY OF THE NATIONAL INSTITUTE OF ARTHRI-TIS, METABOLISM, AND DIGESTIVE DISEASES IN WROCH TO ADVANCE THE NATIONAL ATTACK ON DIABETES FEBRUARY 26 Printed for the use of the Committee on Labor and Public Welfare

### COMMITTEE ON LABOR AND PUBLIC WELFARE

HARRISON A. WILLIAMS, JR., New Jersey, Chairman

JENNINGS RANDOLPH, West Virginia CLAIBORNE PELL, Rhode Island EDWARD M. KENNEDY, Massachusetts **GAYLORD NELSON**, Wisconsin WALTER F. MONDALE, Minnesota **THOMAS F. EAGLETON, Missouri ALAN CRANSTON**, California HAROLD E. HUGHES, Iowa WILLIAM D. HATHAWAY, Maine

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STEWART E. MCCLURE, Ohief Olerk ROBERT E. NAGLE, General Counsel ROY H. MILLENSON, Minority Chief Clerk EUGENE MITTELMAN, Minority Counsel

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U.S. GOVERNMENT PRINTING OFFICE WASHINGTON : 1978 98-093 C

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panied by G. Donald Whedon, M.D., Director, National Institute of	
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Dr. Oscar Crofford (at microphone) testifies in 1973 for increased federal funding for diabetes research.

93D CONGRESS 19T SESSION

# S. 17

3

### IN THE SENATE OF THE UNITED STATES

**JANUARY 4, 1973** Mr. SCHWEIKER introduced the following bill; which was read twice and referred to the Committee on Labor and Public Welfare

### A BILL

To amend the Public Health Service Act to provide for greater and more effective efforts in research and public education with regard to diabetes mellitus.

Be it enacted by the Senate and House of Representa-1 2 tives of the United States of America in Congress assembled,

3 That this Act may be cited as the "National Diabetes Re-

4 search and Education Act".

5 FINDINGS AND DECLARATION OF PUBPOSE

- SEC. 2. (a) The Congress hereby finds and declares-6 (1) that diabetes mellitus is a major health problem 7 8 in the United States; 9
  - (2) that diabetes mellitus contributes to many other

### VANDERBILT UNIVERSITY

- An	NA NA	SHVILLE, TENNESSEE 37203	TELEPHONE 254-5411 AREA 615
Per-			Department of Medicine • School of Medicine November 6, 1972
	MEMOR	ANDUM	*
	T0:	Those Members of the Faculty Known to be E Related to Diabetes	ngaged in Research
	FROM:	Subcommittee on New Research Initiatives Drafting Committee for Diabetes Center App	lication
	RE:	Potential new interdisciplinary research i Diabetes	nitiatives related to $\frac{d_{i}}{d_{i}}$
	Diabe	As you are aware we are attempting to asse tes Center Grant with a rather short deadli	mble an application to a ne. i.e., December 20, 1972,

Diabetes Center Grant with a rather short deadline, i.e., December 20, 1972 We are attempting to meet a November 15 deadline for the first draft. Successful applications could be funded from June 1, 1973.

One important aspect of this application - quoted directly from the National Institutes of Health is as follows:

"Definition of Centers: Centers for research in diabetes will be established to facilitate, improve coordination in, or otherwise enhance the productivity of the research environment of the recipient institution. These centers will provide core resources and services at an institution where a broad and substantial volume of excellent diabetes research already exists.

The centers are conceived as supporting scientific personnel, administration, and center support services to accomplish research goals that would not otherwise be possible. The center grant is <u>not</u> intended to provide direct support for established ongoing research projects.

Funds to initiate projects by new investigators and for exploratory or feasibility studies may be supported by a center grant. Such funds may be requested each year of the center grant but support of any particular new project will be limited to a three-year period, at which time the project should compete for a regular research grant.

Program Orientation: There is no prescribed model for a Diabetes-Endocrinology Center. A center should encompass a unique and substantial research program that has already developed as a result of the efforts of the investigators and the institutions' particular resources and strengths.

ΙN	NDERBILT UNIVERSITY	
3) [2]	NASHVILLE, TENNESSEE 37203	TELEPHONE 254-5411 AREA 615
		ertment of Medicine • School of Medicine vember 6, 1972
ME	MEMORANDUM	
т0	TO: Those Members of the Faculty Known to be Enga Related to Diabetes	ged in Research
FR	FROM: Subcommittee on New Research Initiatives Drafting Committee for Diabetes Center Applic	ation
RE	RE: Potential new interdisciplinary research init Diabetes	iatives related to $\frac{d_i}{d_i}$
We	As you are aware we are attempting to assembl Diabetes Center Grant with a rather short deadline, We are attempting to meet a November 15 deadline fo Successful applications could be funded from June 1	i.e., December 20, 1972. r the first draft.
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<u>fea</u> rec	<u>Funds to initiate projects by new investigato</u> feasibility studies may be supported by a center gra requested each year of the center grant but support	ant. Such funds may be

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# **Genesis of Diabetes Research Center Program**

- Congressional hearings about diabetes research
- New idea: physicians and basic scientists working together in coordinated laboratories or Center would find the fundamental cause and eventually the cure for diabetes

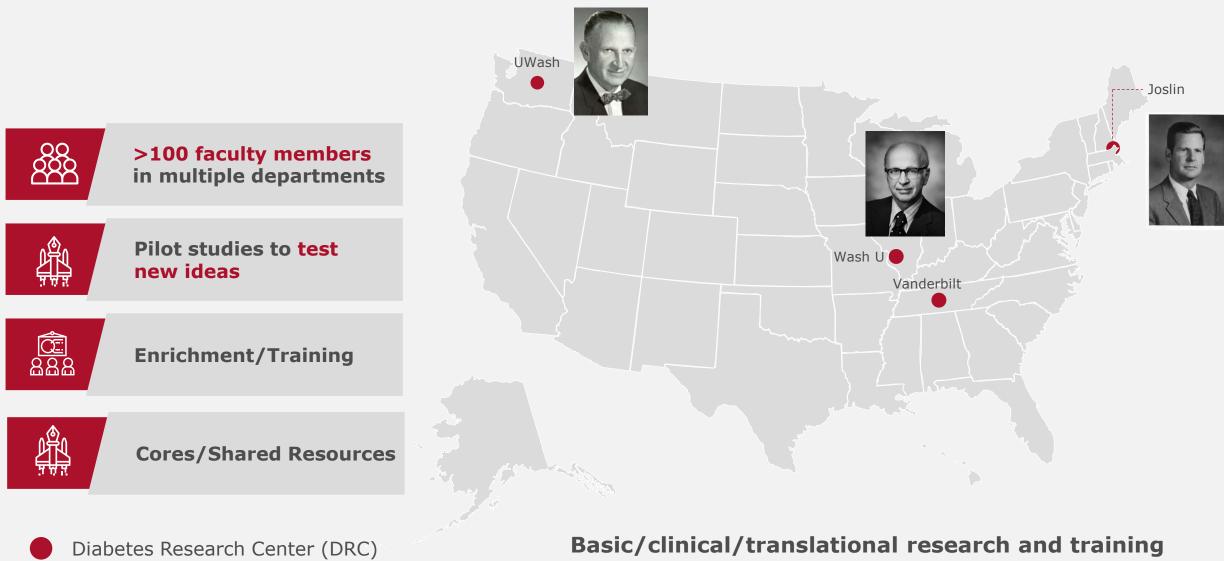
# **Genesis of Diabetes Research Center Program**

- Congressional hearings about diabetes research
- New idea: physicians and basic scientists working together in coordinated laboratories or Center would find the fundamental cause and eventually the cure for diabetes
- NCI cancer centers also began in the mid-1970s.

# **Genesis of Diabetes Research Center Program**

- 21 formal applications submitted 4 recommended for funding (Joslin Clinic in Boston University of Washington, Vanderbilt, and Washington University).
- Allocation was sufficient to fund only one center in first year.
- Vanderbilt University became the first nationally recognized and federally funded center for diabetes research.
- Oscar Crofford was the Principal Investigator of the Vanderbilt grant and Director of the Vanderbilt Center that started in September 1973.
- The following year 3 more Centers were funded: the University of Washington (Robert Williams, PI), Joslin Clinic (George Cahill, PI), and Washington University (William Daughaday, PI).

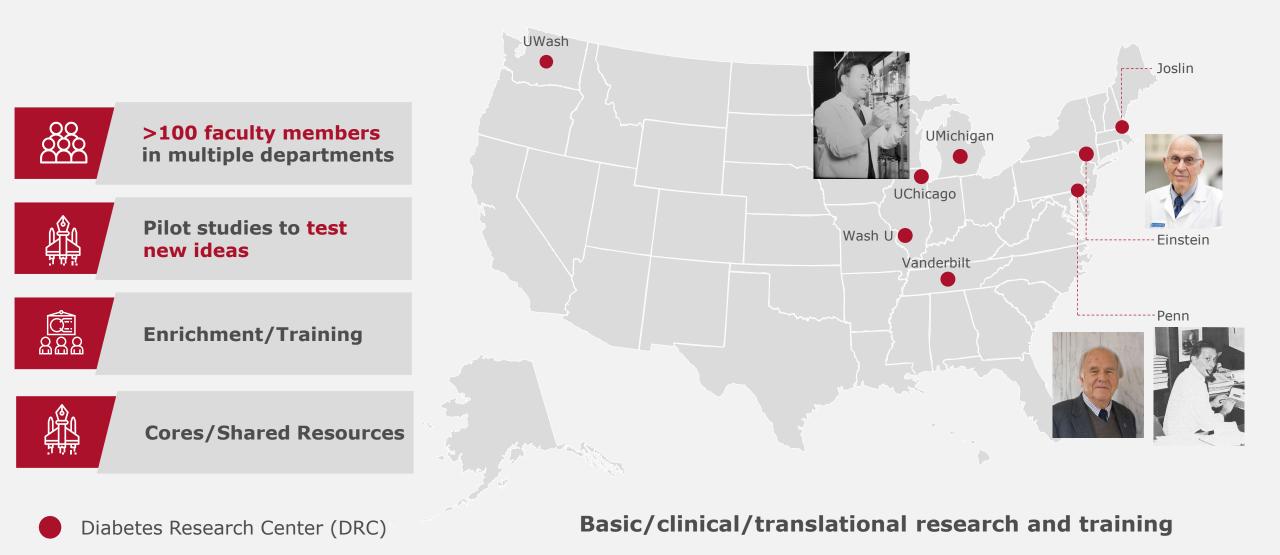
# **NIDDK Diabetes Research Centers**



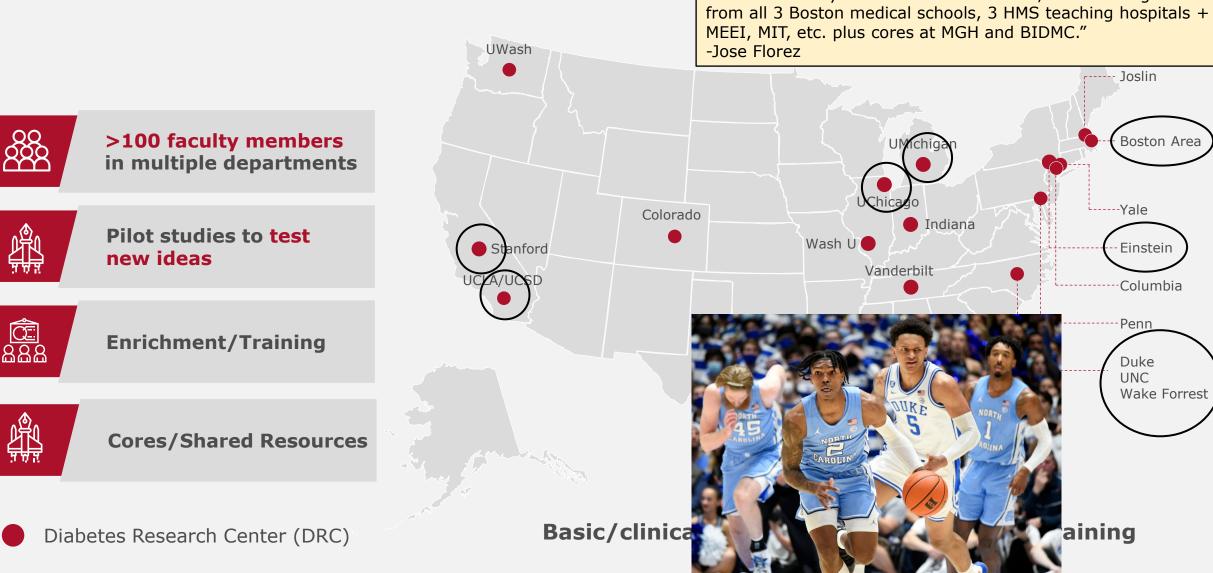
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- Einstein, University of Michigan, University of Chicago, University of Pennsylvania were funded in the 1970s

# **NIDDK Diabetes Research Centers**



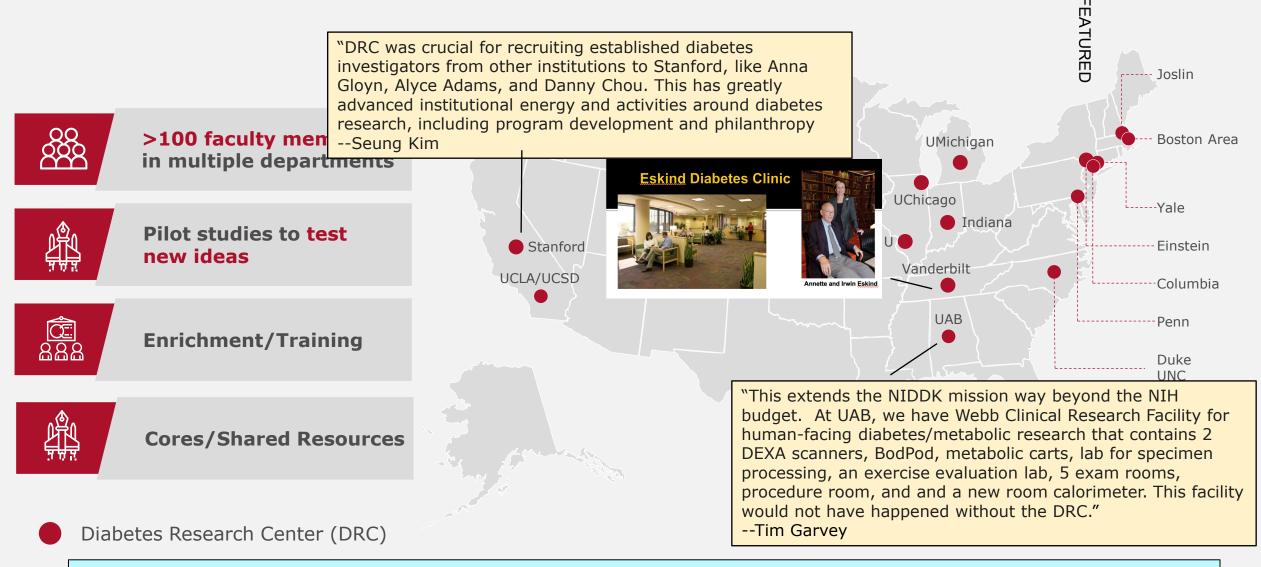
# NIDDK Diabetes Research Centers – Multiinstitutional



# DRCs are an engine for discovery and innovation

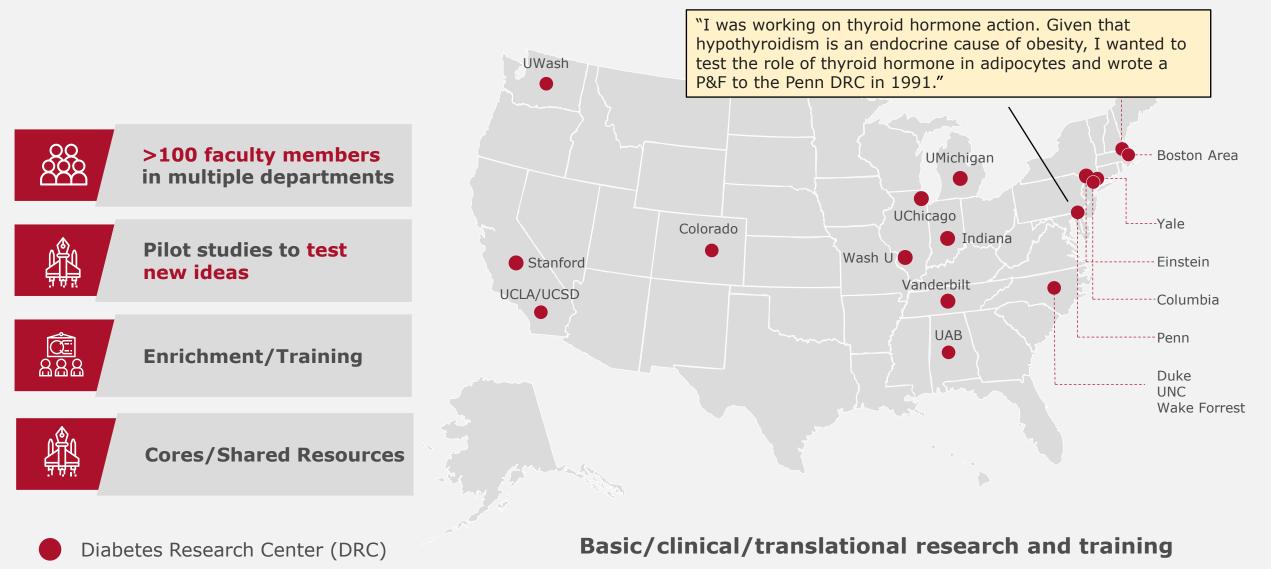
- Many, many discoveries about metabolism, diabetes, and obesity
- Hormone biosynthesis and action, islet development and biology, cross-organ crosstalk, discovery of new molecules that regulate metabolism
- 19/51 Banting Awardees from 1973-2023 worked at and/or led DRCs.
- Developed modern hormone assays and support cores for precise and accurate hormone and metabolite quantification
  - Rigor and reproducibility
  - National cores
- DRCs have impact at an institution and across institutions

# **NIDDK Diabetes Research Centers - institution \***



\*NIH/NIDDK - institutional partnerships are critical, but are not well-appreciated or valued

# **NIDDK Diabetes Research Centers – P&F**

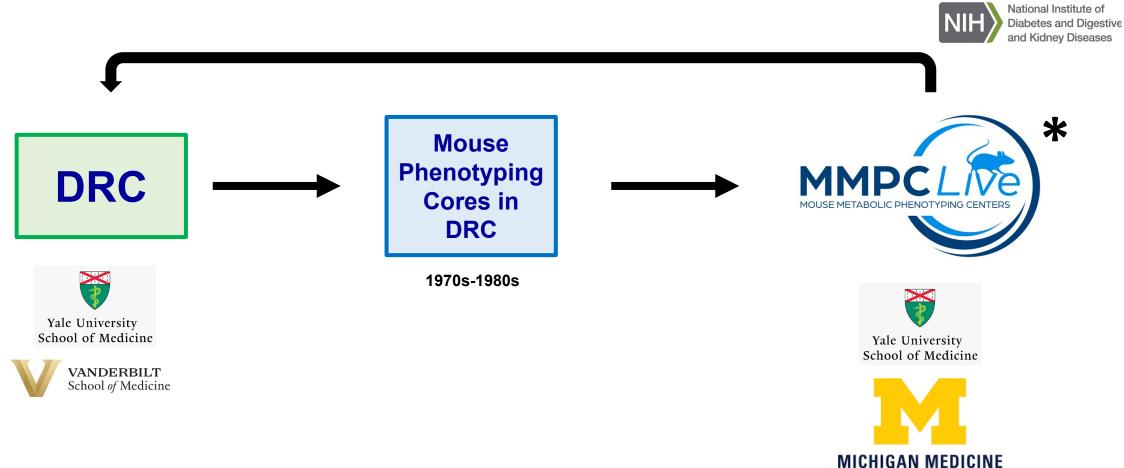


# **Important Aspects of Diabetes Research Centers\***

	First	Second	Third
Create a sense of community/collaboration	17%	8%	58%
Support of cores or shared resources	25%	50%	8%
P&F program	42%	33%	17%
Indirect support of training-related activities		8%	8%
Leverage for institutional support of diabetes- related or metabolism-rated research at your institution	17%		8%

- Established cores and services crucial for diabetes-related research, including rodent metabolic phenotyping, transgenic, nucleotide sequencing, microscopy; many of these evolved to become national programs and/or institutionally-supported cores.\*
- Development of contemporary approaches for studies to leverage mouse models of diabetes and metabolic disease and contributed to development of mouse metabolic phenotyping program\*

# **Impact of Diabetes Research Centers**



UNIVERSITY OF MICHIGAN

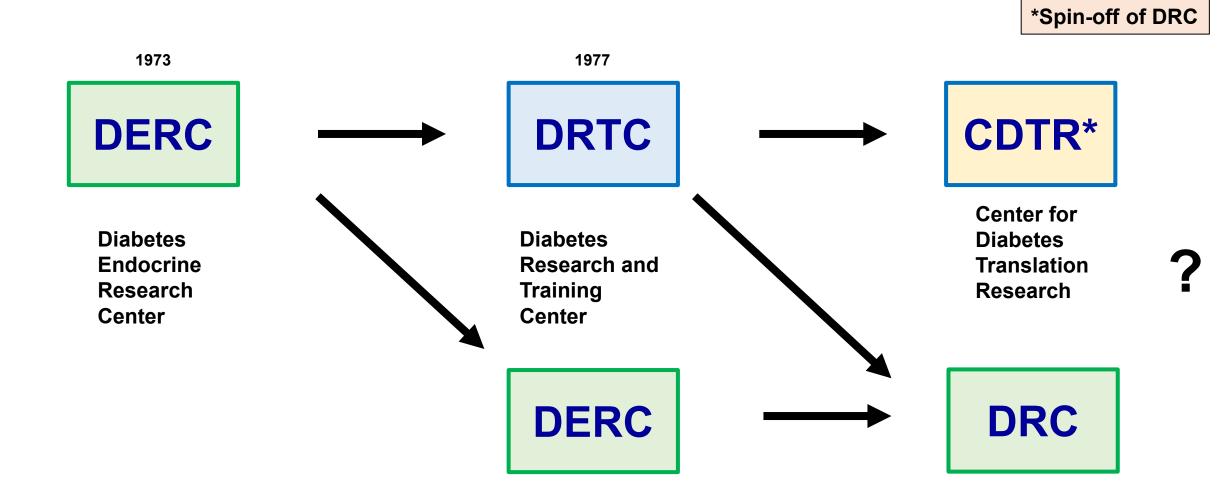
Research supported by



\*Spin-off of DRC

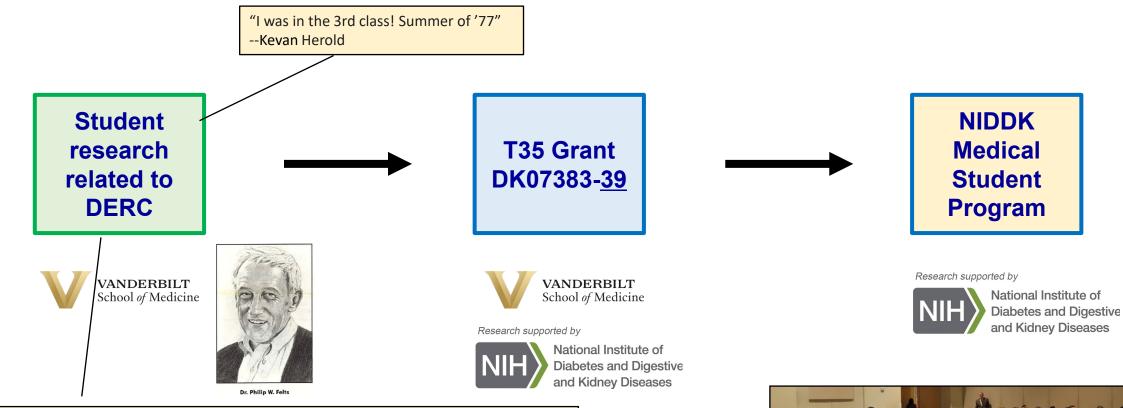
- Establishment of space, equipment, and services to support clinical diabetes research, including the recruitment of research subjects.
- Trained nurses and educators in the previous DTRC era and led to development of current CDTRs

# **Evolution and Growth of Diabetes Research Centers**



- Infrastructure for training at institutions provides critical mass of diabetes investigation that attracts trainees and synergizes with T32 training programs
  - **5.8 training grants affiliated with current DRCs**
  - 3.8 NIDDK training grants affiliated with current DRCs
- National NIDDK Medical Student program
  - Bringing diverse range of trainees into the NIDDK orbit

# **Medical Student Research at Diabetes Research Centers**



"I was in the inaugural class of summer medical students invited to do diabetes research at Vandy during the summer of 1975. I was assigned to work with Oscar Crofford that summer and he assigned me to work with Ulrich Keller who was a visiting clinical fellow from Switzerland in his lab). After the summer research program ended Oscar invited me to stay on for an additional hear to do additional research at Vandy at which time I joined Alan Cherrington's lab."

--Gerald Shulman

- Participation of leadership and members of individual centers in crossinstitution DRC Advisory Boards
  - Cross-institution P&F review panels and DRC Advisory Boards
- Established national P&F program in the COVID era
- Started NIDDK DRC virtual seminar series that is widely viewed around the world

- 41 Seminars since May 2020
- 2,000 unique registrants from >200 institutions in 10 countries

# Diabetes Research Virtual Senaga Series



# Wednesday, June 14, 2023 11:00 AM PT | 12:00 PM MT | 1:00 PM CT | 2:00 PM ET

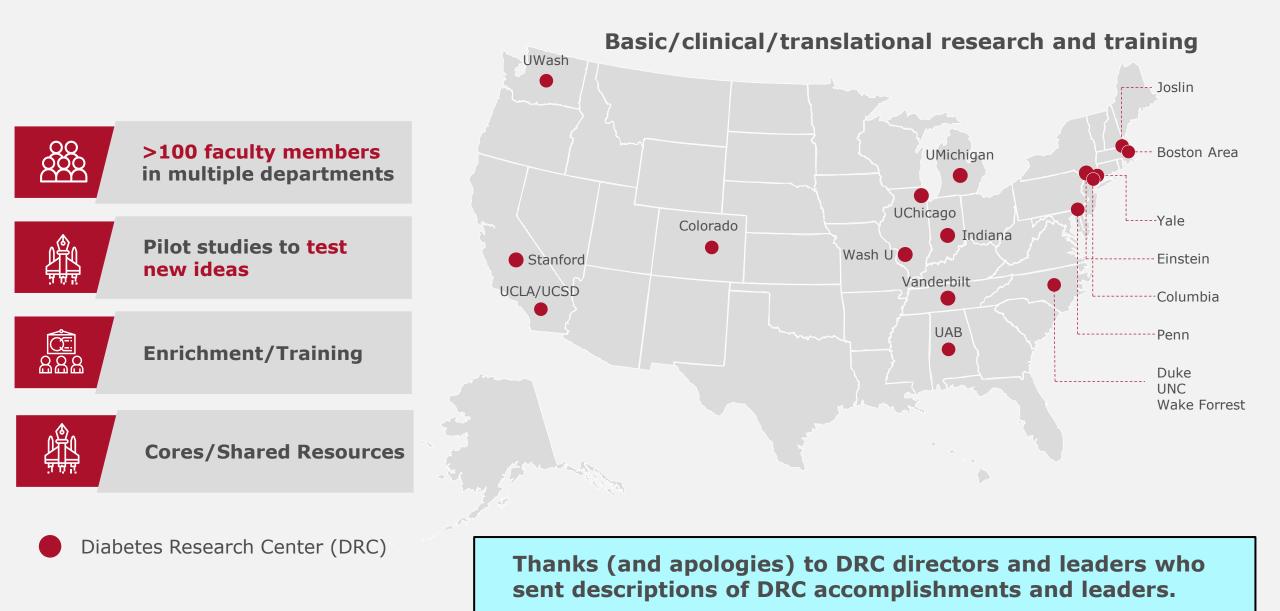
https://zoom.us/j/91323894836

# **Circadian Control of Systemic Metabolism in Type 2 Diabetes**

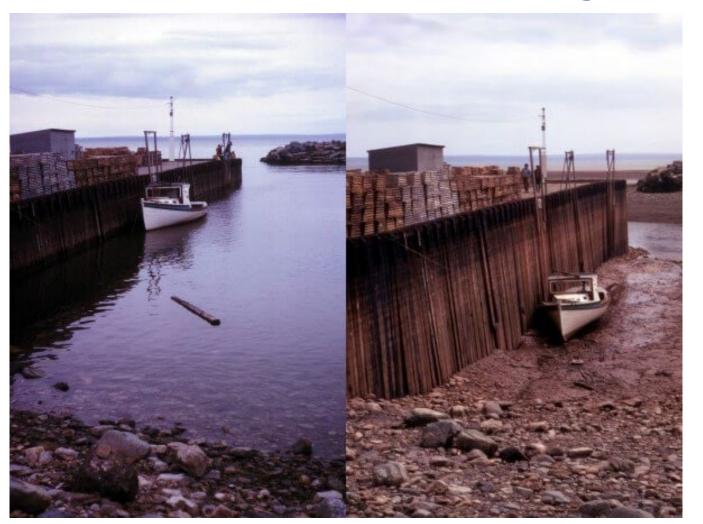
Juleen R. Zierath, PhD Professor, Clinical Integrative Physiology Departments of Molecular Medicine and Surgery and Physiology and Pharmacology Karolinska Institutet, Stockholm, Sweden Professor, Integrative Physiology Executive Director of Novo Nordisk Foundation Center for Basic Metabolic Research, University of Copenhagen



# **Diabetes Research Centers – 50 years of impact**

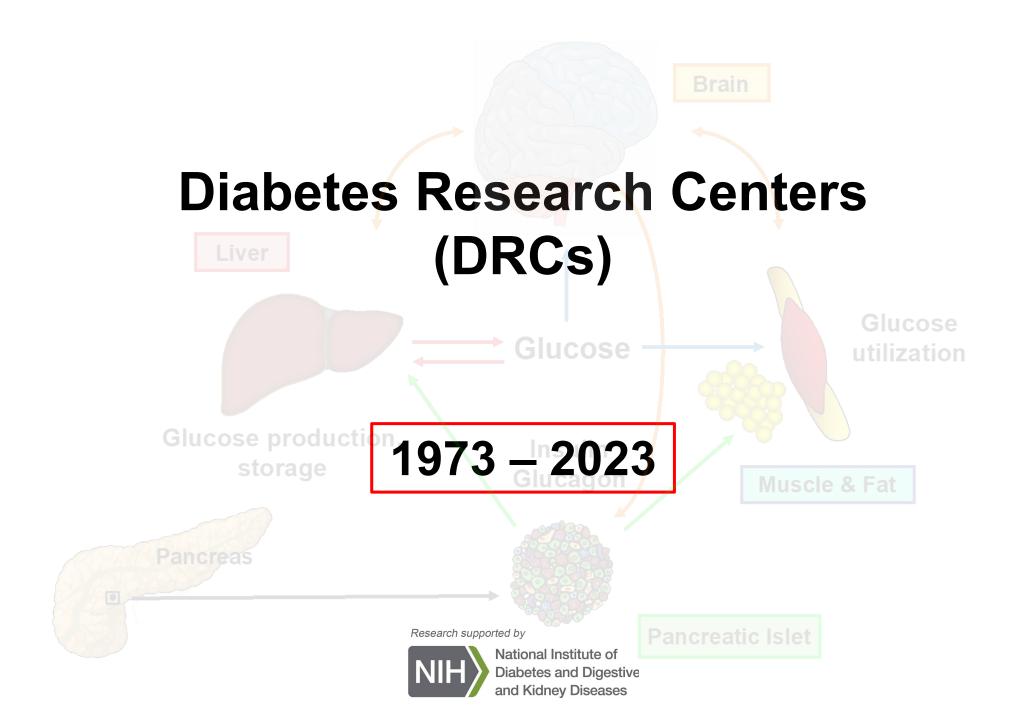


# DRCs raise boats, enabling discovery, innovation, translation, and training....



e te ₩ikipedia

Bay of Fundy, New Brunswick at high and low tide; Tidal range - 56 feet



# **Solution** Solutions **FEATURED PUBLICATIONS**

January 2021- December 2022

Research supported by



National Institute of Diabetes and Digestive and Kidney Diseases

# FEATURED PUBLICATIONS

### **Albert Einstein College of Medicine**

### 2022

Lombardi, A., et al. "In-Hospital Hyperglycemia Is Associated With Worse Outcomes In Patients Admitted With Covid-19.". Diabetes Care, pp. 2683-2688. https://doi.org/10.2337/dc22-0708

Katz, L. S., et al. "Maladaptive Positive Feedback Production Of Chrebpβ Underlies Glucotoxic B-Cell Failure.". Nature Communications, p. 4423. https://doi.org/10.1038/s41467-022-32162-x

Tang, Y., et al. "Tigar Deficiency Enhances Skeletal Muscle Thermogenesis By Increasing Neuromuscular Junction Cholinergic Signaling.". Elife. https://doi.org/10.7554/eLife.73360

# Columbia University

2022

Du, W., et al. "Pharmacological Conversion Of Gut Epithelial Cells Into Insulin-Producing Cells Lowers Glycemia In Diabetic Animals.". The Journal Of Clinical Investigation. https://doi.org/10.1172/JCI162720.

Park, J., et al. "Activation Of The Insulin Receptor By An Insulin Mimetic Peptide.". Nature Communications, p. 5594. https://doi.org/10.1038/s41467-022-33274-0

Postigo-Fernandez, J., et al. "Preclinical Evaluation Of A Precision Medicine Approach To Dna Vaccination In Type 1 Diabetes.". Proceedings Of The National Academy Of Sciences Of The United States Of America, p. e2110987119. https://doi.org/10.1073/pnas.211098711

### Indiana University

2022

Mazor, R., et al. "Mesenteric Fat Cryolipolysis Attenuates Insulin Resistance In The Ossabaw Swine Model Of The Metabolic Syndrome.". Surgery For Obesity And Related Diseases : Official Journal Of The American Society For Bariatric Surgery. https://doi.org/10.1016/j.soard.2022.10.023

Hart, P. A., et al. "A Reduced Pancreatic Polypeptide Response Is Associated With New Onset Pancreatogenic Diabetes Versus Type 2 Diabetes.". The Journal Of Clinical Endocrinology And Metabolism. https://doi.org/10.1210/clinem/dgac670

Yan, S., et al. "Intestinal Gpr17 Deficiency Improves Glucose Metabolism By Promoting Glp-1 Secretion.". Cell Reports, p. 110179. https://doi.org/10.1016/j.celrep.2021.110179

### **Joslin Diabetes Center**

2022

Jhaveri, C. D., et al. "Aflibercept Monotherapy Or Bevacizumab First For Diabetic Macular Edema.". The New England Journal Of Medicine, pp. 692-703. DOI: 10.1056/NEJMoa2204225

Garcia-Martin, R., et al. "MicroRNA Sequence Codes For Small Extracellular Vesicle Release And Cellular Retention.". Nature, pp. 446-451. https://doi.org/10.1038/s41586-021-04234-3

### 2021

Wibowo, M. C., et al. "Reconstruction Of Ancient Microbial Genomes From The Human Gut.". Nature, pp. 234-239. https://doi.org/10.1038/s41586-021-03532-0

### North Carolina

2022

Balikcioglu, P. G., et al. "Branched-Chain A-Keto Acids And Glutamate/Glutamine: Biomarkers Of Insulin Resistance In Childhood Obesity.". Endocrinology, Diabetes & Metabolism. https://doi.org/10.1002/edm2.388

2021

Beavers, K. M., et al. "Risedronate Use To Attenuate Bone Loss Following Sleeve Gastrectomy: Results From A Pilot Randomized Controlled Trial.". Clinical Obesity, p. e12487. https://doi.org/10.1111/cob.12487

Pratley, R. E., et al. "Oral Semaglutide Reduces Hba And Body Weight In Patients With Type 2 Diabetes Regardless Of Background Glucose-Lowering Medication: Pioneer Subgroup Analyses.". Diabetes Therapy : Research, Treatment And Education Of Diabetes And Related Disorders, pp. 1099-1116. https://doi.org/10.1007/s13300-020-00994-9

### Stanford University

2022

Chang, C. A., et al. "Curative Islet And Hematopoietic Cell Transplantation In Diabetic Mice Without Toxic Bone Marrow Conditioning.". Cell Reports, p. 111615. https://doi.org/10.1016/j.celrep.2022.111615

Nguyen, H. P., et al. "Aifm2 Is Required For High-Intensity Aerobic Exercise In Promoting Glucose Utilization.". Diabetes, pp. 2084-2093. https://doi.org/10.2337/db21-1114

Ang, L. T., et al. "Generating Human Artery And Vein Cells From Pluripotent Stem Cells Highlights The Arterial Tropism Of Nipah And Hendra Viruses.". Cell, pp. 2523-2541.e30. https://doi.org/10.1016/j.cell.2022.05.024

## UCSD-UCLA

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Kim, J. Y., et al. "PiDDosome-SCAP Crosstalk Controls High-Fructose-Diet-Dependent Transition From Simple Steatosis To Steatohepatitis.". Cell Metabolism, pp. 1548-1560.e6. DOI:https://doi.org/10.1016/j.cmet.2022.08.005 Keinan, O., et al. "Glycogen Metabolism Links Glucose Homeostasis To Thermogenesis In Adipocytes.". Nature, pp. 296-301. https://doi.org/10.1038/s41586-021-04019-8

### University of Alabama

### 2023

Prasad, R., et al. "Maintenance Of Enteral Ace2 Prevents Diabetic Retinopathy In Type 1 Diabetes.". Circulation Research, pp. e1-e21. https://doi.org/10.1161/CIRCRESAHA.122.322003

### 2022

Kim, T., et al. "Hepatic Mtorc2 Signaling Facilitates Acute Glucagon Receptor Enhancement Of Insulin-Stimulated Glucose Homeostasis In Mice.". Diabetes, pp. 2123-2135. https://doi.org/10.2337/db21-1018

Xu, G., et al. "Exploratory Study Reveals Far Reaching Systemic And Cellular Effects Of Verapamil Treatment In Subjects With Type 1 Diabetes.". Nature Communications, p. 1159. https://doi.org/10.1038/s41467-022-28826-3

### **University of Chicago**

2022

Hepler, C., et al. "Time-Restricted Feeding Mitigates Obesity Through Adipocyte Thermogenesis.". Science (New York, N.y.), pp. 276-284. https://doi.org/10.1126/science.abl8007

### 2021

Anderson-Baucum, E., et al. "Deoxyhypusine Synthase Promotes A Pro-Inflammatory Macrophage Phenotype.". Cell Metabolism, pp. 1883-1893.e7. https://doi.org/10.1016/j.cmet.2021.08.003

Joslin, A. C., et al. "A Functional Genomics Pipeline Identifies Pleiotropy And Cross-Tissue Effects Within Obesity-Associated Gwas Loci.". Nature Communications, p. 5253. https://doi.org/10.1038/s41467-021-25614-3

### University of Colorado Denver

### 2022

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### University of Michigan

2022

Shrestha, N., et al. "Integration Of ER Protein Quality Control Mechanisms Defines B-Cell Function And ER Architecture.". The Journal Of Clinical Investigation. https://doi.org/10.1172/JCI163584

Sidarala, V., et al. "Mitofusin 1 And 2 Regulation Of Mitochondrial DNA Content Is A Critical Determinant Of Glucose Homeostasis.". Nature Communications, p. 2340. https://doi.org/10.1038/s41467-022-29945-7

2021

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### University of Pennsylvania

2022

Su, C., et al. "3D Chromatin Maps Of The Human Pancreas Reveal Lineage-Specific Regulatory Architecture Of T2D Risk.". Cell Metabolism, pp. 1394-1409.e4. https://doi.org/10.1016/j.cmet.2022.08.014

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2021

Sheng, X., et al. "Mapping The Genetic Architecture Of Human Traits To Cell Types In The Kidney Identifies Mechanisms Of Disease And Potential Treatments.". Nature Genetics, pp. 1322-1333. https://doi.org/10.1038/s41588-021-00909-9

### **University of Washington**

2022

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Foulon, N., et al. "Multiplexed Quantification Of Insulin And C-Peptide By Lc-Ms/Ms Without The Use Of Antibodies.". Journal Of Mass Spectrometry And Advances In The Clinical Lab, pp. 19-26. https://doi.org/10.1016/j.jmsacl.2022.06.003

Matsuura, Y., et al. "Diabetes Suppresses Glucose Uptake And Glycolysis In Macrophages.". Circulation Research, pp. 779-781. https://doi.org/10.1161/CIRCRESAHA.121.320060

## Vanderbilt University

## 2022

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### 2021

Shrestha, S., et al. "Combinatorial Transcription Factor Profiles Predict Mature And Functional Human Islet A And B Cells.". Jci Insight. https://doi.org/10.1172/jci.insight.151621

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### Washington University in St Louis

2022

Cho, J. H., et al. "Islet Primary Cilia Motility Controls Insulin Secretion.". Science Advances, p. eabq8486. https://doi.org/10.1126/sciadv.abq8486

Ng, X. W., et al. "Rhoa As A Signaling Hub Controlling Glucagon Secretion From Pancreatic A-Cells.". Diabetes, pp. 2384-2394. https://doi.org/10.2337/db21-1010

Wu, H., et al. "Mapping The Single-Cell Transcriptomic Response Of Murine Diabetic Kidney Disease To Therapies.". Cell Metabolism, pp. 1064-1078.e6. https://doi.org/10.1016/j.cmet.2022.05.010

### Yale University

2022

Hubbard, B. T., et al. "Q-Flux: A Method To Assess Hepatic Mitochondrial Succinate Dehydrogenase, Methylmalonyl-Coa Mutase, And Glutaminase Fluxes In Vivo.". Cell Metabolism, pp. 212-226.e4. https://doi.org/10.1016/j.cmet.2022.11.011

Wang, Q., et al. "II-27 Signalling Promotes Adipocyte Thermogenesis And Energy Expenditure.". Nature, pp. 314-318. https://doi.org/10.1038/s41586-021-04127-5

Sims, E. K., et al. "Teplizumab Improves And Stabilizes Beta Cell Function In Antibody-Positive High-Risk Individuals.". Science Translational Medicine. https://doi.org/10.1126/scitranslmed.abc8980