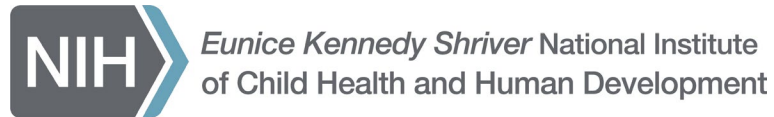


# NICHD Director's Report

Diana W. Bianchi, M.D.

June 7, 2021



## **Talk Outline**

- NIH Budget
- COVID-19 Research Updates
- Human Placenta Project
- NICHD Staff Updates



# NIH Budget

# FY 2022 Appropriations

- Congress is interested in NICHD-supported science!
- Testified at both House and Senate Appropriations subcommittee hearings for the FY 2022 budget
- Questions on:
  - COVID in children (including long-term effects of the pandemic)
  - Maternal health
  - Medications taken by breastfeeding women
  - Trans-NIH Pediatric Research Consortium (N-PeRC)
  - Artificial intelligence
  - Environmental influences on Child Health Outcomes (ECHO)

## FY 2022 Budget Request for the National Institutes of Health

Date: Tuesday, May 25, 2021 - 10:00am

FY 2022 Budget Request for the National Institutes of Health

Subcommittees:

[The Departments of Labor, Health and Human Services, Education, and Related Agencies \(117th Congress\)](#)



### Witnesses

Dr. Diana W. Bianchi

Director, Eunice Kennedy Shriver National Institute of Child Health and Human Development



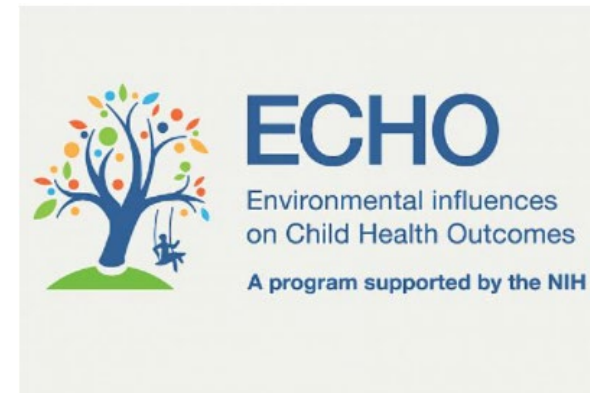
# FY 2022 Appropriations

- President's Budget released May 28, 2021
- NIH - \$51 billion, increase of \$9 billion
  - Includes \$6.5 billion to establish an Advanced Research Projects Agency for Health (ARPA-H)
- NICHD –
  - \$1.94 billion, which includes:
    - \$30 M for the IMPROVE initiative (Implementing a Maternal health and PRegnancy Outcomes Vision for Everyone)
    - \$15 M for research on effects of SARS-CoV-2 infection in children
  - Proposes to move two programs (and their budgets) from NIH OD to NICHD
    - Environmental influences on Child Health Outcomes (ECHO)
    - INCLUDE project (INvestigation of Co-occurring conditions across the Lifespan to Understand Down syndrome)



# Environmental influences on Child Health Outcomes (ECHO)

- Understanding the effects of environmental exposures on child health and development through existing cohort studies
- Two major components
  - Cohorts — observational research
    - Share standardized core data elements
    - Current data includes >90,000 participants (>57,000 children)
  - IDeA States Pediatric Clinical Trials Network — intervention research
- Focuses on 5 key pediatric outcomes with high public health impact
  - Pre-, peri-, and postnatal outcomes
  - Upper and lower airway disorders
  - Obesity
  - Neurodevelopment
  - Positive health



# ECHO Research and Opportunities

- ECHO staff will add expertise to NICHD: pediatric epidemiology, longitudinal studies, clinical trials, building networks/consortia, data science, toxicology, team science
- We are already close collaborators (e.g., DIPHR)
- Opioid epidemic - ECHO partners with NICHD on the Advancing Clinical Trials in Neonatal Opioid Withdrawal (ACT NOW) as part of the HEAL initiative
  - Pharmacologic and non-pharmacologic trials to build evidence for best practices to care for newborns with opioid withdrawal syndrome
- Recent ECHO research headlines
  - Development of new asthma differs by age, sex, and race for children
  - Identified a chromosomal variant associated with wheezing phenotypes in childhood
  - Understanding childhood obesity in the US: Leverages data from 37,000 children across 70 cohorts
  - Influence of sleep on children's well-being
- Upcoming workshop: Pre-conceptual Origins of Child Health Outcomes (June 17-18)





# **COVID-19 Research**



# COVID-19 Vaccination and Menstruation

- 56 letters of interest responding to initial outreach
- NICHD issued a Notice of Special Interest ([NOT-HD-21-035](#)) seeking projects that would include:
  - Validated measures
  - Participants from diverse/understudied populations
  - Existing large cohorts or data sets
- High priority projects include studies that:
  - Include baseline (pre-vaccination) menstrual health data
  - Address mechanism for vaccine-related menstrual changes, if found
  - Account for effects of non-vaccine variables of the current environment (e.g., stress) on menstrual health
- Applications due June 17; awards anticipated late July 2021



# Intramural Research: COVID-19 and the Placenta



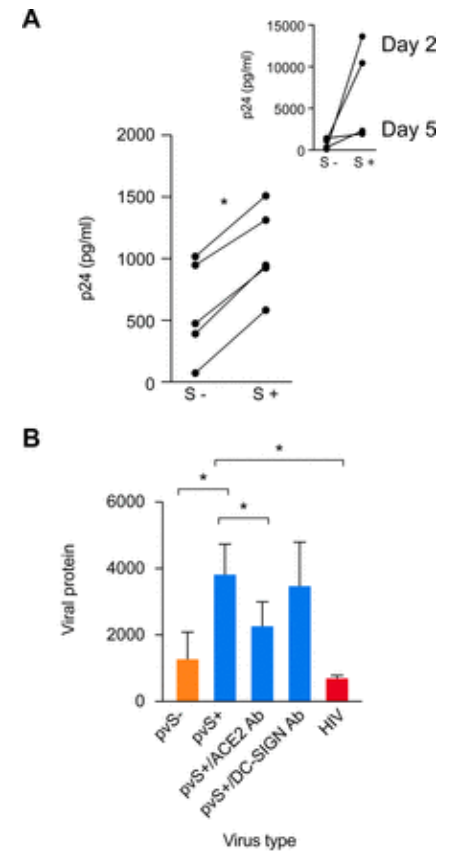
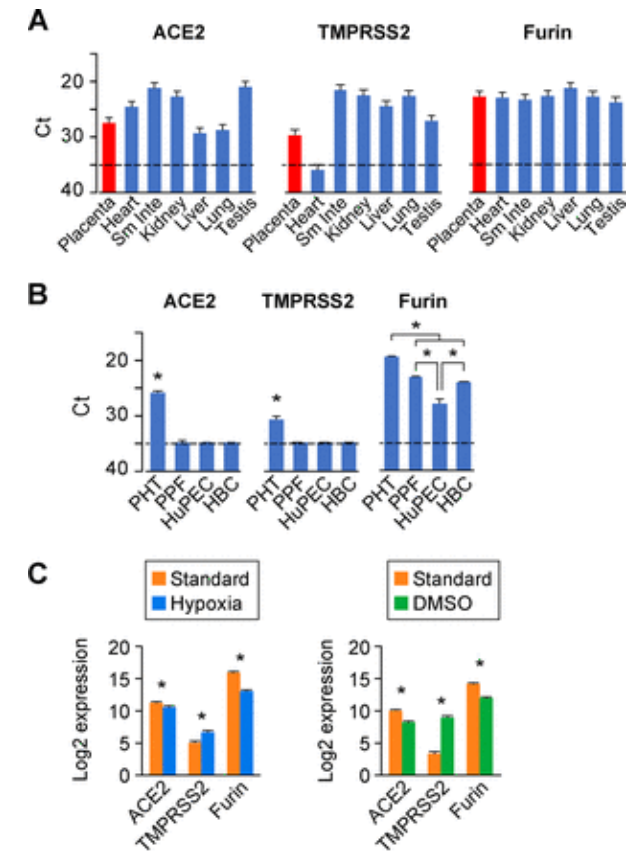
RESEARCH ARTICLE



## Term Human Placental Trophoblasts Express SARS-CoV-2 Entry Factors ACE2, TMPRSS2, and Furin

Yingshi Ouyang,<sup>a</sup> Tarique Bagalkot,<sup>b</sup> Wendy Fitzgerald,<sup>c</sup> Elena Sadovsky,<sup>a</sup> Tianjiao Chu,<sup>a</sup> Ana Martínez-Marchal,<sup>a</sup> Miguel Briño-Enríquez,<sup>a</sup> Emily J. Su,<sup>d</sup> Leonid Margolis,<sup>c</sup> Alexander Sorkin,<sup>b</sup> Yoel Sadovsky<sup>a,e</sup>

- This study, which included NICHD DIR staff, demonstrated that the placenta does express receptors, such as ACE2, at term
- The expression level of these receptors varies over gestation
- The study suggests a mechanism for why SARS-CoV-2 does not cross the placenta

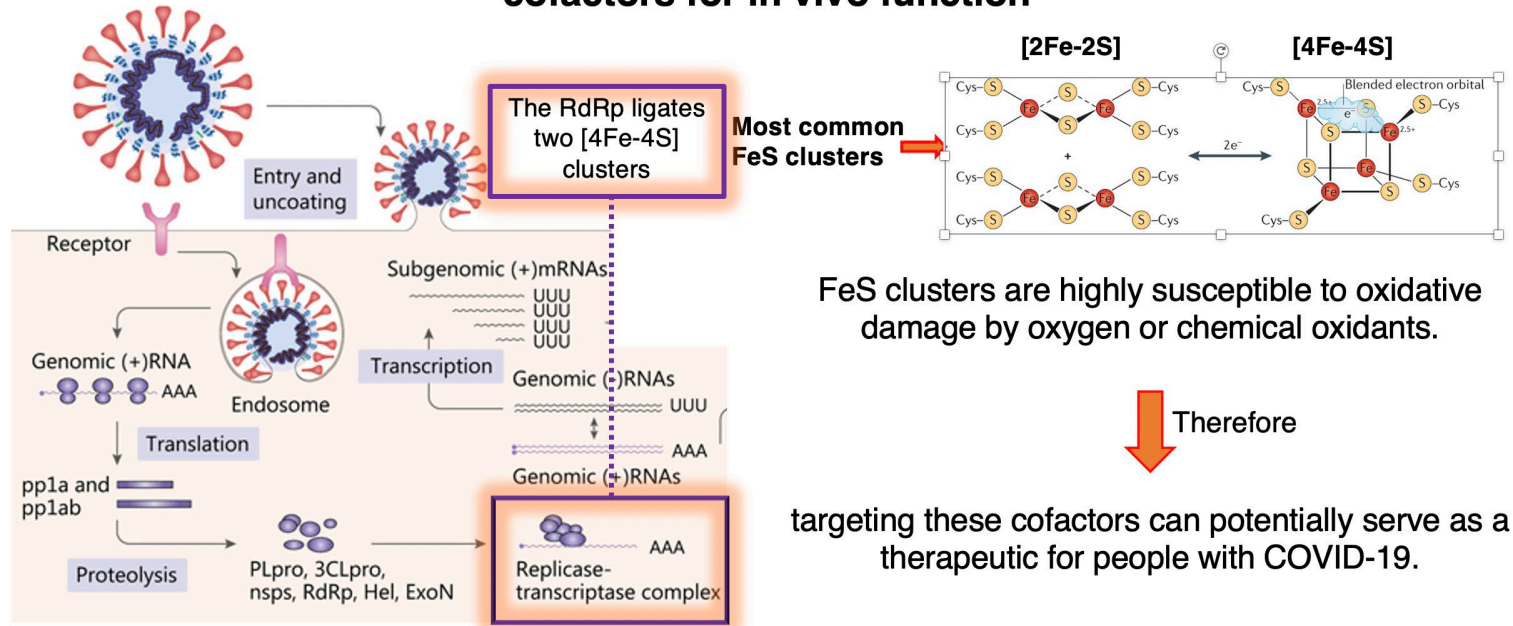


<https://msphere.asm.org/content/6/2/e00250-21>



# Rouault Lab: Section on Human Iron Metabolism

**A new proposed medicinal therapy for COVID-19 based on the discovery that its RNA dependent replicase (RdRp) requires iron sulfur (FeS) cofactors for in vivo function**



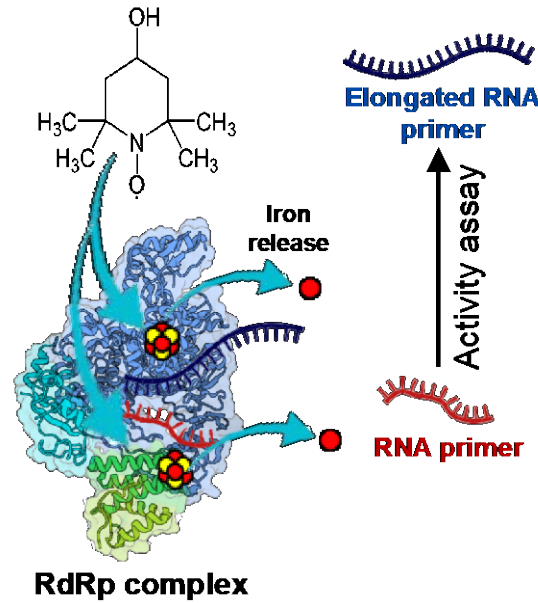
- The Rouault Lab is studying ways to prevent early SARS-CoV-2 infection from spreading to neighboring cells
- SARS-CoV-2 uses an enzyme, RNA replicase, to replicate its genome and transcribe its genes. Targeting this enzyme can cripple the virus' ability to replicate and infect cells
- The lab has found that the SARS-CoV-2 RNA replicase requires iron sulfur clusters as cofactors. Targeting these cofactors can potentially serve as a therapeutic for people with COVID-19
- **Published online in *Science***



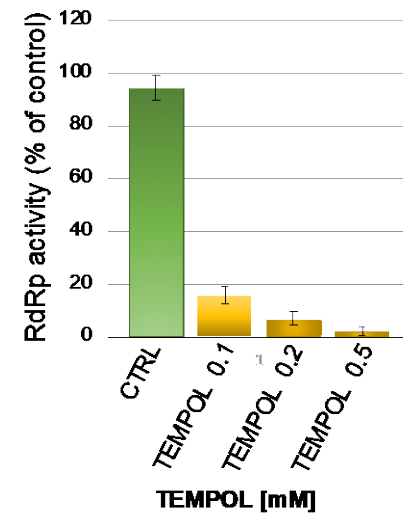
# Rouault Lab: Section on Human Iron Metabolism

## TEMPOL inhibits the activity of the RdRp complex of SARS-CoV-2 and kills live virus in cell cultures

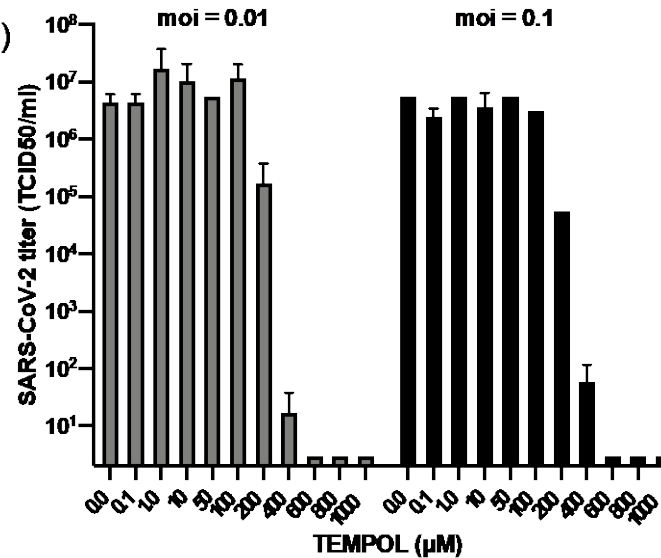
TEMPOL can degrade accessible FeS clusters



TEMPOL potently inhibits the activity of the SARS-CoV2 RdRp (primer extension assay)



TEMPOL kills live virus in cell culture







- The drug TEMPOL is a membrane-permeable radical scavenger that can degrade accessible iron sulfur clusters
- The experiment in the middle shows that TEMPOL can block the activity of the SARS-CoV-2 RNA replicase. The experiment on the right shows that TEMPOL can kill live virus in cell cultures
- The doses that kill the virus are comparable to doses used in previous mouse and human studies for other conditions
- The lab is working with collaborators to potentially test TEMPOL in a clinical study for COVID-19
- Published online in *Science*



# NIH Rapid Acceleration of Diagnostics (RADx)<sup>SM</sup>



Project	Description
 <b>RADx Tech</b>	Highly competitive, rapid three-phase challenge to identify the best candidates for at-home or point-of-care tests for COVID-19
 <b>RADx-Advanced Testing Program (RADx-ATP)</b>	Rapid scale-up of advanced POC technologies to accelerate and enhance and validate throughput – and support of ultra-high throughput machines and facilities
 <b>RADx-Radical (RADx-rad)</b>	Develop and advance novel, non-traditional approaches or new applications of existing approaches for testing
 <b>RADx-Underserved Populations (RADx-UP)</b>	Interlinked community-engaged projects focused on implementation strategies to enable and enhance testing of COVID-19 in underserved and/or vulnerable populations

# RADx-UP Return to School Diagnostic Testing Approaches

**Budget:** \$50M Total; \$33M recommended for funding in R2S Phase I

**Goal:** Develop and test COVID-19 diagnostic testing approaches to safely return children and staff to the in-person school setting in underserved and vulnerable communities

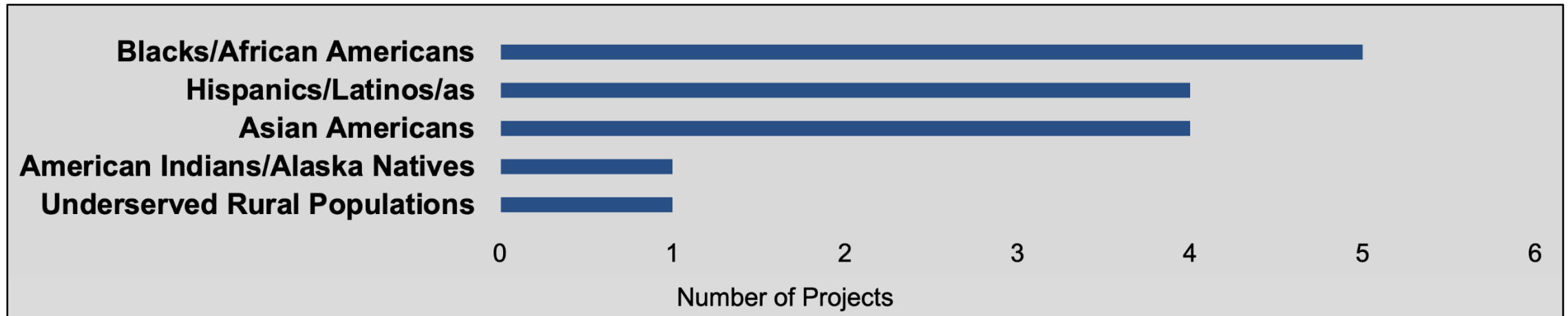
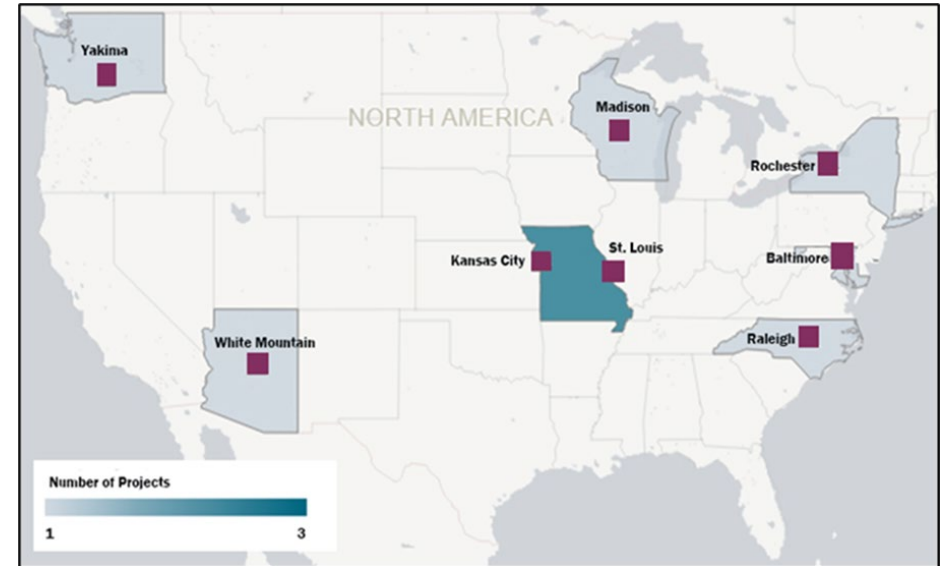
**Mechanism:** Other Transaction Authority to provide flexibility for changing circumstances and funding of non-traditional partners

- Focus on children and adolescents below the age eligible for vaccination via Emergency Use Authorization; include children through high school based on timing of award and rates of vaccination in the community
- Advance methods to integrate testing in return to or maintenance of in-person instruction
- Identify effective, scalable, and sustainable testing implementation strategies, including in-school testing, in community pediatric primary care clinics, childcare centers, preschool, and school settings serving primarily underserved or disadvantaged children and their families.



# Phase I Projects

- Projects cover a range of settings including **public, charter, tribal, early education, and special education schools**
- Children range in age from **3-17 years**, with the majority of projects covering children from 6-17 years of age
- Critically, these projects include **children with medical complexity or intellectual or developmental disabilities** who may not be able to use other mitigation strategies



# Phase II Scientific Goals

- Address the **impact of vaccine availability** for school personnel and students ages 12 and older; include efforts to increase **vaccine confidence**
- Provide information on circulating **variants** and **breakthrough infections** following vaccination
- Increase the reach of the research in **racial and ethnic groups** not included in applications funded in Phase I
- Ensure coverage of **early education or preschool cohorts** and specific strategies for testing and mitigation in this population
- Focus on increasing the geographic areas covered to understand **regional variation** in mitigation strategies and to increase the number of projects in **dense, urban areas or hard to reach rural areas**

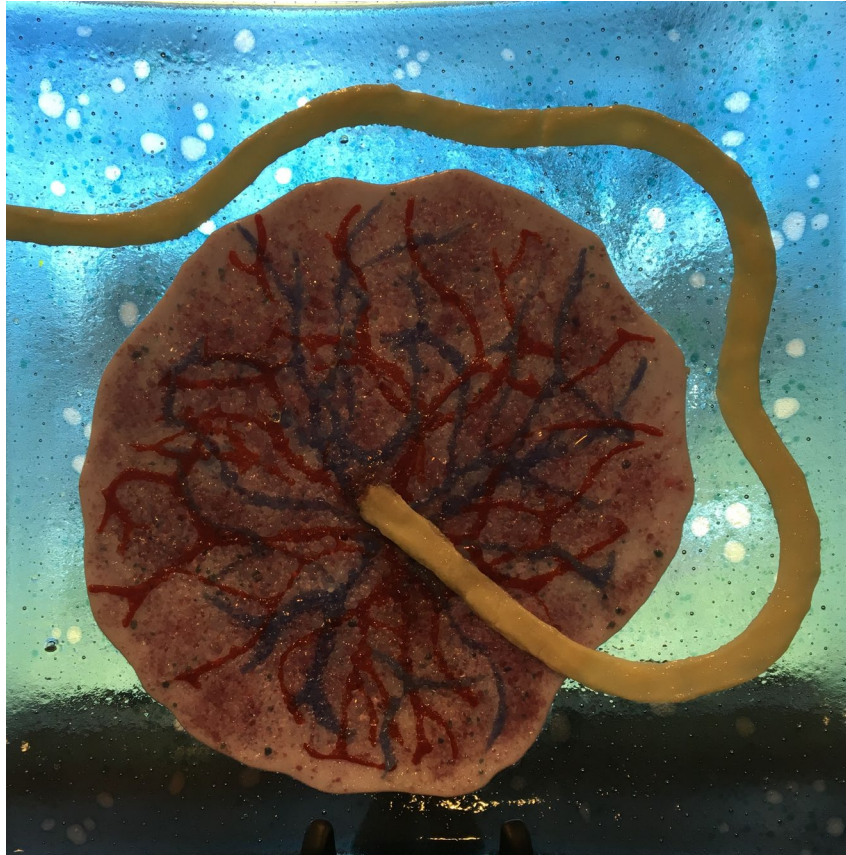






# **Human Placenta Project**

# NICHD Science: Human Placenta Project

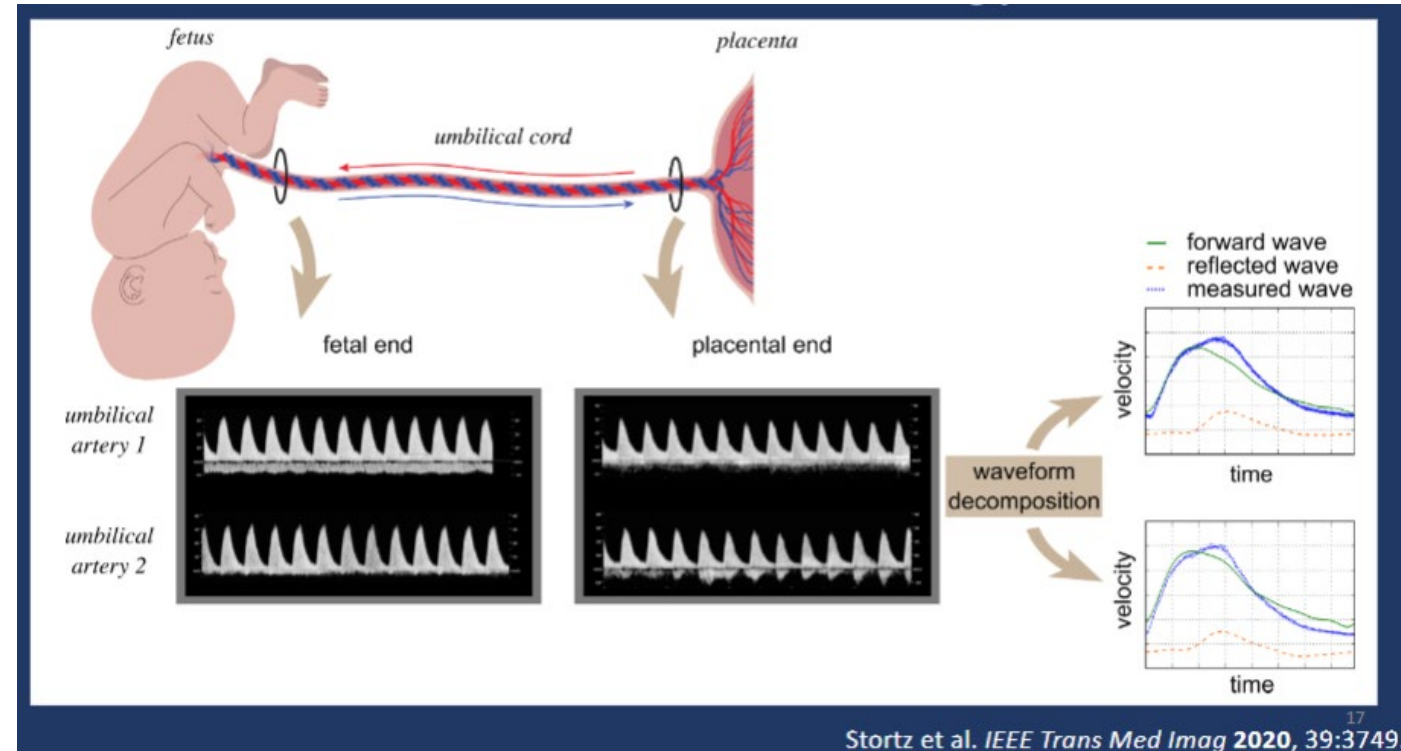


- The placenta is NICHD's organ
- NICHD has supported HPP with >\$91M over 7 years
- HPP investment is *in addition* to a large and continued investment in basic placenta research
- Hundreds of publications
- Some advances translate to other areas of research (e.g., rapid COVID-19 testing; novel approaches to isolate extracellular vesicles)
- Placenta is connected to cardiac disease, diabetes, and other conditions later in life
  - *“The placenta is the center of the chronic disease universe.”* – Kent Thornburg



# HPP Imaging Advances: Wave Reflection

- Wave reflection is related to villous tree structure (mouse model)
- Wave reflection measurements are altered in the presence of placental pathology, such as growth restriction in study of 427 patients
- Increased sensitivity compared to Uterine Artery Pulsatility Index
- Potential marker of pregnancies at risk for stillbirth

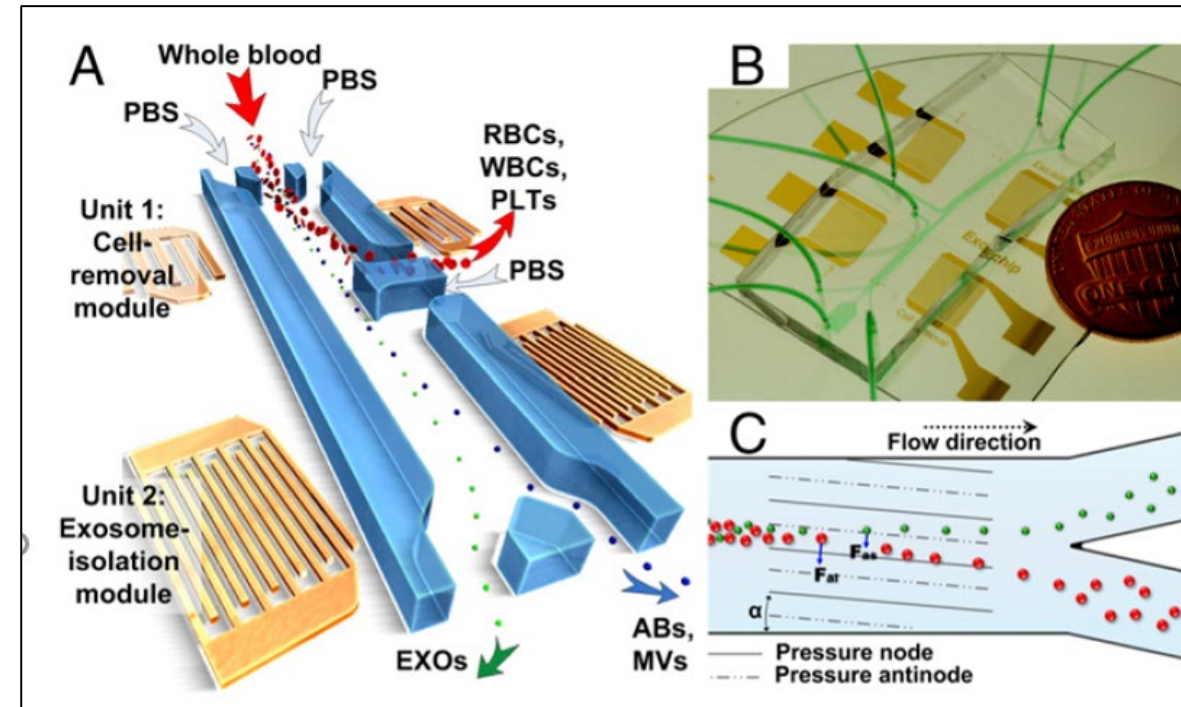


Lindsay Cahill (Memorial University of Newfoundland) and John Sled (U Toronto)



# HPP Advances: Placental Vesicles

- Placental vesicles are a recently appreciated element of the maternal/fetal/placental ecosystem
- Placental vesicle characteristics and cargo (microRNAs, lipids, proteins) may reflect placental health
- Acoustic/microfluidic isolation represents a gentle, high yield approach
- Works for vesicles from any source circulating in blood



Yoel Sadovsky (Magee Women's) and Tony Huang (Duke)  
Wu M, et al. PNAS 2017 Oct 3; 114(40):10584-10589





# **NICHD Staff Updates**

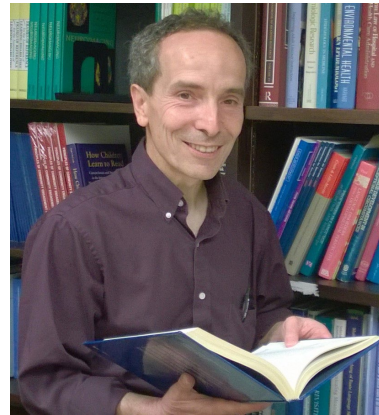
# Welcome to New NICHD Extramural Staff!



Maggie Young  
*Chief Grants Management  
Officer*  
DER



Marianne Galcynski  
*Grants Management  
Specialist*  
GMB



Bob Tamburro, MD, MSc  
*Senior Advisor for Clinical  
Research*  
DER



Jolanta  
Topczewska, PhD  
*Scientific Review  
Officer*  
SRB



Jagpreet Nanda, PhD  
*Scientific Review Officer*  
SRB



# Welcome to New NICHD Extramural Staff!



Maria Nurminskaya,  
PhD  
*Program Officer*  
NCMRR



Kimberlea Gibbs, MPH  
*Nutrition Specialist*  
PGNB



Alison Harrill, PhD  
*Program Officer*  
OPPTB



Molly Minnear, PhD  
*Program Officer*  
IDDB



# Welcome to New NICHD Intramural Staff!



Laverne Mensah, MD  
*Deputy Clinical  
Director*



Bobby Cheon, PhD  
*Tenure-track  
Investigator  
DIPHR*



Hiren Karathia, PhD  
*Staff Scientist  
DIPHR*



James Morton, PhD  
*Tenure-track  
Investigator  
DIPHR*

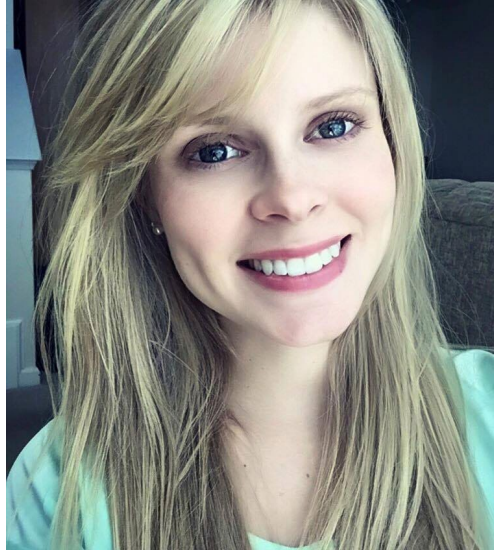




# Welcome to NICHD Office of the Director Staff!



Laura Berkson, JD  
*Director, Office of  
Legislation, Public  
Policy, and Ethics*



Kimberly Kober  
*Management  
Analyst*



Adam Politis, MA  
*Special Assistant to  
the Deputy Director*



Hillary Hoffman, PhD  
*Science Writer/Editor*



# Leadership Positions: Searches Underway

- **NICHD Scientific Director**
  - Readvertising the position
  - Charged the search committee
  - Recruitment open from June 1 - August 1
- **Director, Division of Population Health Research (DIPHR)**
- We are hiring for multiple other positions
  - Tenure track investigators in basic and translational science
  - Opportunities in Division of Extramural Research
  - More info at <https://www.nichd.nih.gov/about/jobs>





**Thank You!**

**Questions?**