Office of Research Innovation, Validation, and Application (ORIVA)

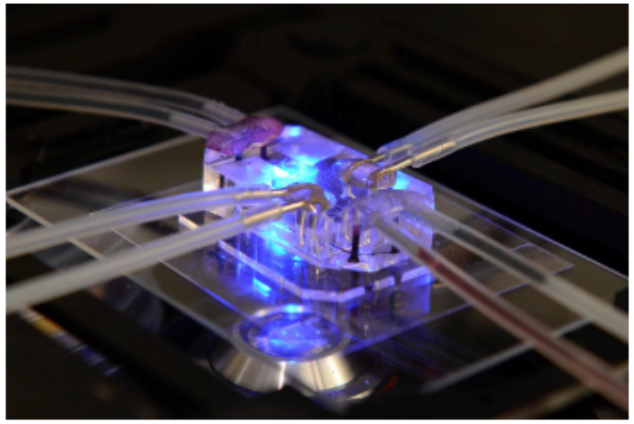
Warren Casey, PhD, DABT

Director, ORIVA

NIH to prioritize human-based research technologies

New initiative aims to reduce use of animals in NIH-funded research.

The National Institutes of Health (NIH) is adopting a new initiative to expand innovative, human-based science while reducing animal use in research. Developing and using cutting-edge alternative nonanimal research models aligns with the U.S. Food and Drug Administration's (FDA) recent initiative to reduce testing in animals. While traditional animal models continue to be vital to advancing scientific knowledge, using new and emerging technologies can offer unique strengths that, when utilized correctly or in combination, can expand the toolbox for researchers to answer previously difficult or unanswerable biomedical research questions.



Combining microfabrication techniques with modern tissue engineering, the lung-on-a-chip, designed by the Wyss Institute at Harvard University, offers a new in vitro approach to drug screening by mimicking the complicated mechanical and biochemical behaviors of a human lung. The lung-on-a-chip work was supported by NIH Common Fund and FDA. *Wyss Institute, Harvard University*

"For decades, our biomedical research system has relied heavily on animal models. With this initiative, NIH is ushering in a new era of innovation," said NIH Director Dr. Jay Bhattacharya. "By integrating advances in data science and technology with our growing understanding of human biology, we can fundamentally reimagine the way research is conducted—from clinical development to real-world application. This human-based approach will accelerate innovation, improve healthcare outcomes, and deliver life-changing treatments. It marks a critical leap forward for science, public trust, and patient care."

Jay Bhattacharya, M.D., Ph.D.
Director, NIH

News Release, April 29, 2025 (2)

"By integrating advances in data science and technology with our growing understanding of human biology, we can fundamentally reimagine the way research is conducted—from clinical development to real-world application. ***This human-based approach will accelerate innovation, improve healthcare outcomes, and deliver life-changing treatments. It marks a critical leap forward for science, public trust, and patient care***."

Jay Bhattacharya, M.D., Ph.D.
Director, NIH

To integrate innovative human-based science, the NIH intends to establish the **Office of Research Innovation, Validation, and Application (ORIVA)** within NIH's Office of the Director to **coordinate** NIH-wide efforts to develop, validate, and scale the use of human-based science and technology across the agency's biomedical research portfolio and serve as a hub for interagency coordination and regulatory translation for public health protection.

https://www.nih.gov/news-events/news-releases/nih-prioritize-human-based-research-technologies

News Release, June 15 , 2026

NIH National Institutes of Health
Turning Discovery Into Health

Monday, June 15, 2026

NIH launches new office to advance human-based research and reduce animal use

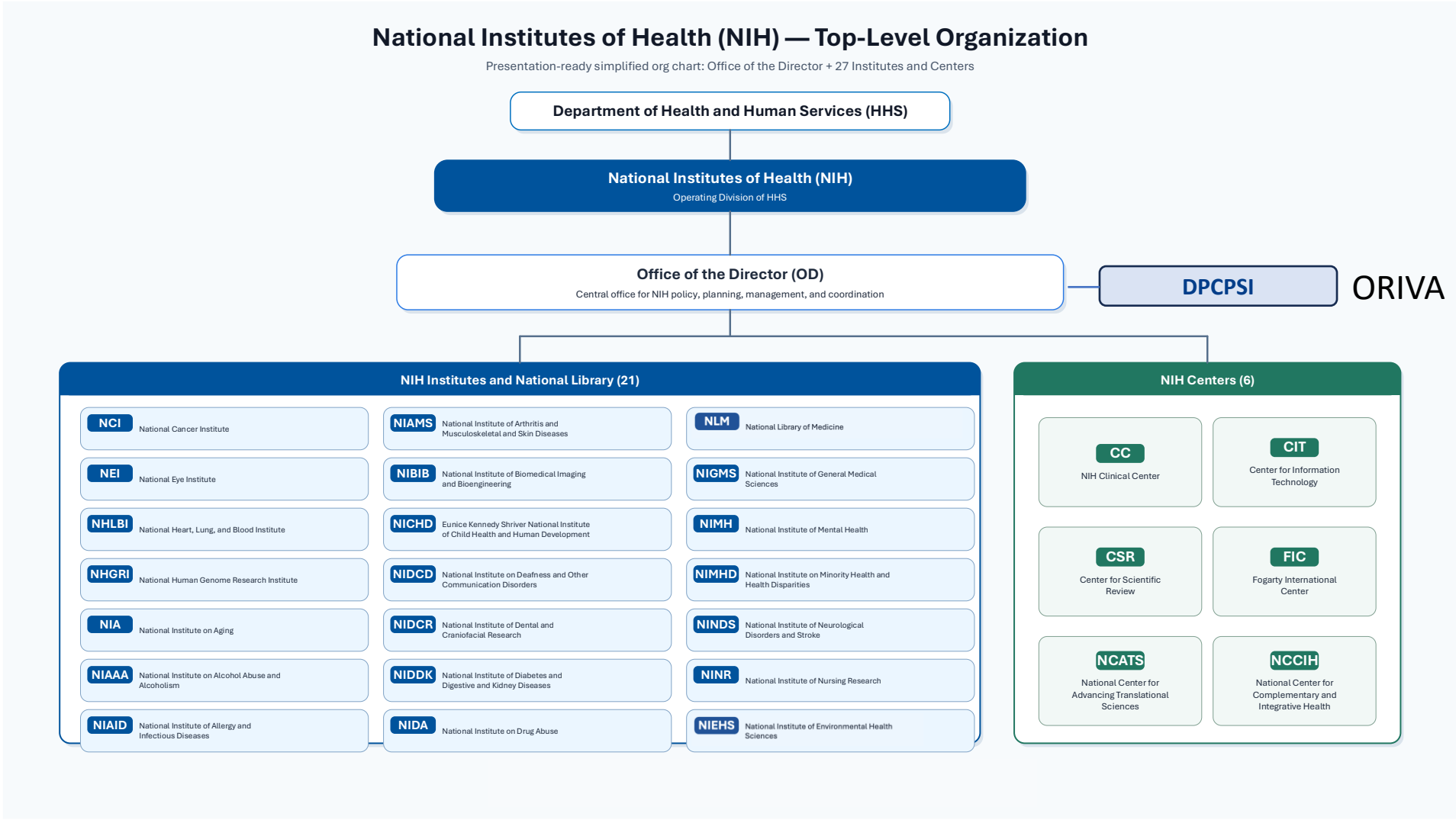
The National Institutes of Health (NIH) today announced the creation of the Office of Research Innovation, Validation, and Application, or ORIVA, to speed the development and use of human-based research technologies across NIH.

ORIVA will coordinate NIH-wide efforts to develop, validate and scale New Approach Methodologies, or NAMs, including 3D human tissue models, computational tools and other animal-free methods that can better reflect human biology. The office will also serve as a hub for interagency coordination and regulatory translation.

NIH National Institutes of Health
Division of Program Coordination, Planning, and Strategic Initiatives

Division of Program Coordination, Planning, and Strategic Initiatives (DPCPSI)

NIH National Institutes of Health
Division of Program Coordination, Planning, and Strategic Initiatives



Division of Program Coordination, Planning, and Strategic Initiatives (DPCPSI)

National Institutes of Health
Division of Program Coordination, Planning, and Strategic Initiatives

Nicole C. Kleinstreuer, Ph.D
Deputy Director, NIH
Director, DPCPSI

Aligns & Catalyzes Science

Develops Resources

Facilitates Strategic Coordination

DPCPSI, leading through synergistic **coordination** of its Offices and through vital IC partnerships, **identifies** and **catalyzes** research to address scientific gaps and opportunities, **fosters** collaborations, **develops** methods to enable research goals, and **serves** as an experimental testbed for innovative NIH-wide activities to improve the health of the Nation.

National Institutes of Health
Division of Program Coordination, Planning, and Strategic Initiatives

ORIVA

Office of Research Innovation, Validation, and Application

- **Coordinate** NIH-wide efforts to develop, validate, and scale the use of **human-based science across the NIH biomedical research** enterprise, thereby reducing reliance on animals in research.

- Serve as a **coordinating hub** for **interagency efforts** to advance the development, evaluation, and uptake of **non-animal approaches in regulatory testing of drugs and chemicals to replace existing guideline animal studies.**

- Expand **training and infrastructure** for human-based approaches

ORIVA

Office of Research Innovation, Validation, and Application (1)

16FTEs

D-NICEATM

Division of the National Interagency Center
for the Evaluation of Alternative Test Methods

DAIBR

Division for Accelerating Innovation in Biomedical Research

GENERAL DYNAMICS
Information Technology

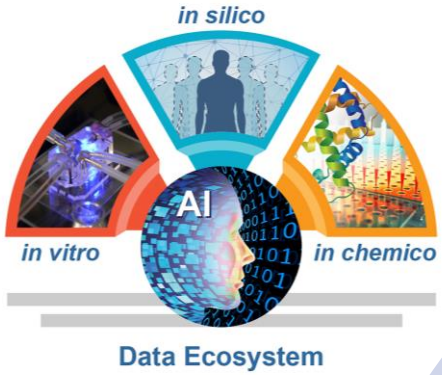
In Silico In Vitro Logistics Software AI

Support Contract, ~30 FTEs

The Human-Based Science Confidence Continuum:

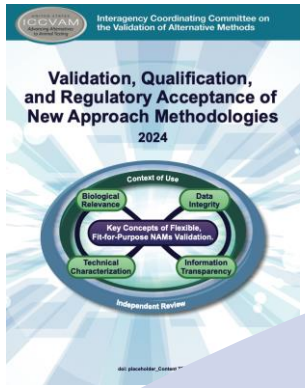
from Biomedical Research to Regulatory Implementation (1)

NIH National Institutes of Health
Division of Program Coordination, Planning, and Strategic Initiatives



Biomedical Research

Validation/ Qualification



Regulatory Implementation

UNITED STATES ICCVAM
Advancing Alternatives to Animal Testing

FDA

ICH
harmonisation for better health

OECD

ORIVA

Office of Research Innovation, Validation, and Application (2)

DAIBR

Division for Accelerating Innovation in Biomedical Research

D-NICEATM

Division of the National Interagency Center
for the Evaluation of Alternative Test Methods

GENERAL DYNAMICS
Information Technology

In Silico In Vitro Logistics Software AI

Support Contract

DAIBR

Division for Accelerating Innovation in Biomedical Research

- Fulfills a critical part of the biomedical research continuum, serving to **strategically support** the **development and application of human-based approaches** that build the bridge between innovative basic science and human medicine.
- Supports **training and infrastructure** in these areas.

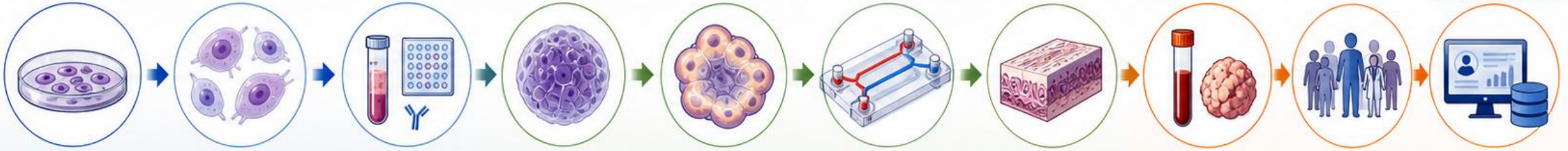
The Human-Based Science Consortium

A spectrum of increasingly complex, human-relevant models and data that drive translational insights and improve human health

REDUCTIONIST / LEGACY MODELS
Lower human relevance

ADVANCED HUMAN-DERIVED SYSTEMS
Greater biological complexity

HUMAN-CENTERED DATA & BIOLOGY
Highest human relevance



Immortalized Cell Lines	Primary Cells	Biomarkers (in vitro)	iPSCs	Organoids	Microphysiological Systems (MPS)	*Ex Vivo* Human Tissues	Human Clinical Samples	Human Subjects (Clinical Studies)	Electronic Health Records (EHRs) & Real-World Data
Easy to grow, highly reproducible, genetically adapted to culture	Finite lifespan, retain many features of cells in vivo	Molecular or cellular readouts in human cells or biofluids	Patient-specific, pluripotent cells; renewable source	3D structures that recapitulate key features of human organs	Engineered systems that model the function of human organs	Native human tissues maintained in their near-physiologic state	Biospecimens from patients representing disease diversity	Prospective studies generating outcomes in real people	Longitudinal, large-scale data capturing real-world health and outcomes
2D	2D	Analytical	Cells	3D Tissues	Engineered Tissues / Organ Systems	Tissues	Clinical Samples	People	Data / Populations

Lower	HUMAN BIOLOGICAL RELEVANCE	Higher
Lower	SYSTEM COMPLEXITY & INTEGRATION	Higher
Less	REAL-WORLD CONTEXT & EVIDENCE	More

Integrating approaches across this continuum accelerates discovery, improves translation, and advances precision medicine and public health.

ORIVA / DAIBR Co-Funding FY26 ($22M)

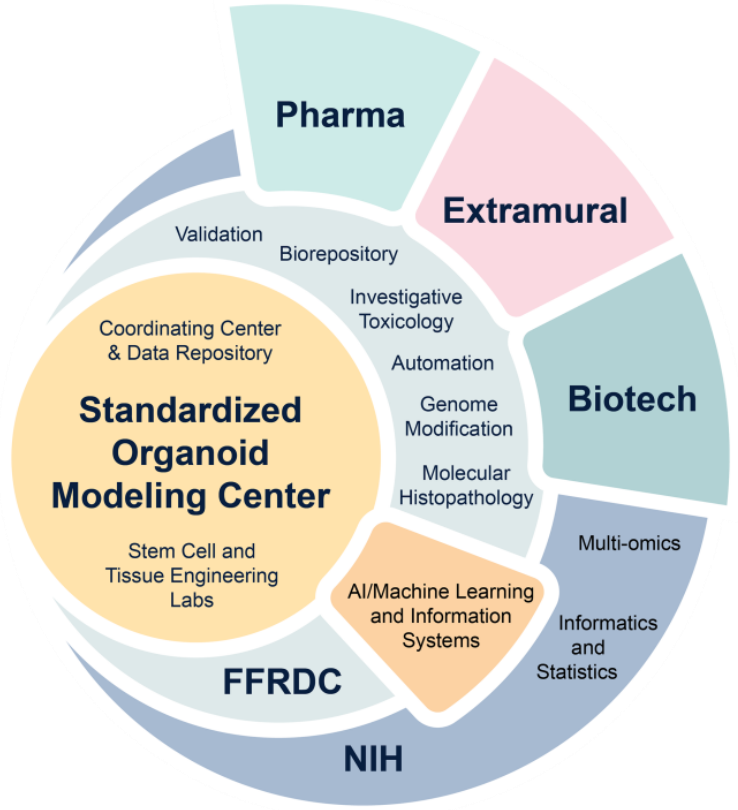
- Quantum Sensing Technology Challenge for Enhancing Detection capabilities in NAMs for Safety and toxicity studies, w NCATS
- Translational Centers for Microphysiological Systems (TraCe-MPS), w/ FDA iSTAND
- Complement-ARIE Technology Development Center: OPTIMA: Oncology Precision Trials using Individualized Model Avatars, w NCI
- Cell Model and Evaluation Core, UAB
- hiPSC-Reprogramming and Cell Culture Module, U. Pittsburgh
- Multi-Scale Computational Modeling Core (MCM), Clemson University
- Computational Modeling of Hormone Homeostasis, 5 awards
- AI-Human Discovery Engines for Mechanistic Cancer Biology, Cornell University
- Stem Cell, Organoid and Cell Phenotyping Module, UT Southwestern

NIH Standardized Organoid Modeling (SOM) Center

National Institutes of Health
Division of Program Coordination, Planning, and Strategic Initiatives

The SOM Center aims to serve as a neutral scientific hub for standardization, developing organoids that are reproducible, reliable, and accessible for medical research. By establishing validated, fit-for-purpose protocols for organoids that replicate key structural and functional characteristics of human organs, the center will support efforts to reduce reliance on animal testing, generate more precise human-based data, and minimize variability across laboratories.

- **Artificial Intelligence (AI) and Machine Learning (ML)** to mine scientific literature and experimental data to optimize protocols in real time.
- **Advanced Robotics and Imaging** to enable high-throughput, scalable organoid production and analysis.
- **Heterogeneous Human Cell Sources** to ensure organoids reflect real-world biological differences, including age, sex, and genetic ancestry.
- **Open-Access Digital and Physical Repositories** so scientists can access standardized protocols, data, and living organoids everywhere.



National Institutes of Health
Division of Program Coordination, Planning, and Strategic Initiatives

D-NICEATM

Division of the National Interagency Center for the Evaluation of Alternative Test Methods (1)

NTP Interagency Center for the Evaluation of Alternative Toxicological Methods @ NIEHS

National Interagency Center for the Evaluation of Alternative **Test** Methods @ OD / DPCPSI / ORIVA

D-NICEATM

Division of the National Interagency Center for the Evaluation of Alternative Test Methods (2)

- A **coordinating hub** for interagency efforts to advance the development, evaluation, and uptake of human-based approaches in regulatory testing of drugs and chemicals.
- **Develop, evaluate, and promote** the use of human-based approaches in biomedical research.
- **Support NAMs-related activities** with relevant national and international organizations, particularly the:
  - **Interagency Coordinating Committee on the Validation of Alternative Methods (ICCVAM)**
  - Organization for Economic Cooperation and Development (OECD)

Human-based Science & Technology Coordinating Committee (HSTCC)

- Composed of ICO representatives from across the National Institutes of Health (NIH), plus representatives from major initiatives such as SOM and Complement-ARIE
- Identify scientific and regulatory areas that will be prioritized by ORIVA as well as gaps and challenges in human-based science and technology
- Coordinate human-based research activities and initiatives across NIH in along with mechanisms of ongoing collaboration and engagement
- Identify specific topics and areas for translational potential and industry engagement

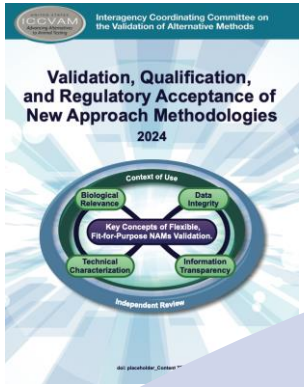
Executive Committee on Advancing the 3Rs in NIH-Supported Research

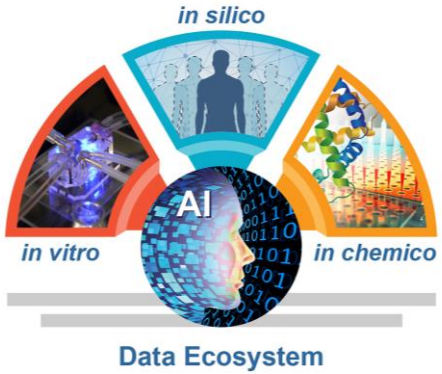
NIH has established the “Executive Committee on Advancing the 3Rs in NIH-Supported Research” to advise NIH leadership on the development of a strategy for advancing the 3Rs (replacement, reduction, and refinement of animal use) in NIH-supported research and to guide implementation of that strategy across NIH.

The Human-Based Science Confidence Continuum:

from Biomedical Research to Regulatory Implementation (2)

NIH National Institutes of Health
Division of Program Coordination, Planning, and Strategic Initiatives





Biomedical Research

HSTCC

Validation/ Qualification

UNITED STATES ICCVAM Advancing Alternatives to Animal Testing

Regulatory Implementation

FDA

ICH harmonisation for better health

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Thank You!