Complement-ARIE: Complement Animal Research In Experimentation

Margaret Ochocinska, PhD

Program Leader
Re-engineering the Research Enterprise
Office of Strategic Coordination, NIH/OD

ICCVAM Public Forum

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Common Fund Historical Perspective

2004: NIH Roadmap is launched

December 9, 2006: Congress unanimously reauthorizes the NIH

Establishes the Division of Program Coordination, Planning, and Strategic Initiatives (DPCPSI) within Office of the Director and the NIH Common Fund to provide a dedicated source of funding to enable *trans*-NIH research

The Common Fund Moves the NIH Mission Forward – Faster

Supporting bold scientific programs that **catalyze discovery** across all biomedical and behavioral research

Advances areas of biomedical and behavioral research important to the missions of multiple NIH Institutes and Centers

Spurs subsequent biomedical advances that otherwise would not be possible without an initial strategic investment

Features of Common Fund Programs and How They Catalyze Biomedical Discovery

Making substantial investments in time-limited, goal-driven programs that significantly change the trajectory of biomedical research.

Accelerate emerging science

Remove research roadblocks

Enhance the research workforce

Support high-risk, high-reward science

Common Fund Science and Management are Collaborative

Scientists from diverse disciplines provide input as we plan new programs.

Researchers participate in interdisciplinary consortia to tackle shared goals.

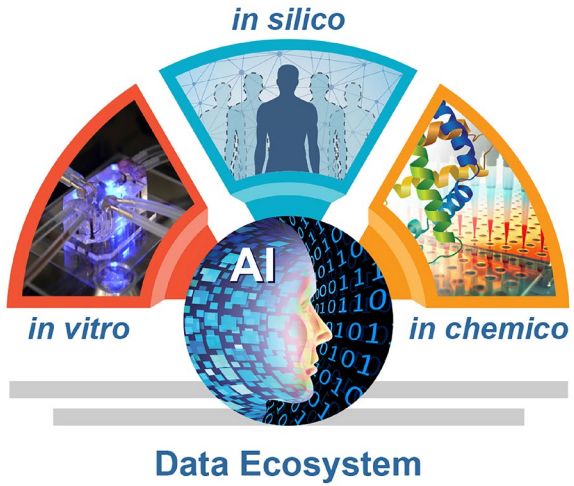
Leadership and staff from Institutes, Centers, and the Office of the Director work together to design funding opportunities and oversee the projects.

Statement of Purpose and Goals of Complement-ARIE

Purpose: To catalyze the development, standardization, validation and use of **human-based new approach methodologies (NAMs)** that will transform the way we do basic, translational, and clinical sciences

Goals:

1. Better model and **understand human health and disease** outcomes **across diverse populations**.
2. Develop NAMs that **provide insight into specific biological processes** or disease states.
3. Validate mature NAMs to **support regulatory use** and standardization.
4. Complement traditional models and **make biomedical research more efficient and effective**.



Complement-ARIE Working Group

NIH The Common Fund

Working Group Co-Chairs
Joni Rutter, NCATS
Rick Woychik, NIEHS

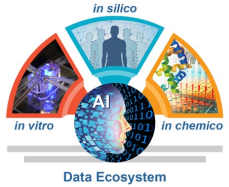
Common Fund Program Leaders
Margaret Ochocinska, OSC
Anthony Kirilusha, OSC

Working Group Coordinators
Dan Tagle, NCATS
Dan Shaughnessy, NIEHS

Strategic Vision & SME
Nicole Kleinstreuer, NIEHS

Common Fund Points of Contact
Katelynn Milora, OSC
Tony Casco, OSC

Scientific Review Contact
Jessica Smith, CSR



Working Group Members
Elaine Collier, NCATS
Passley Hargrove-Grimes, NCATS
Christine Happel, NCATS
Chariz Johnstone, NCATS
Dmitriy Krepkiy, NCATS
Dobrila Rudnicki, NCATS
Geetha Senthil, NCATS
Kris Sunderic, NCATS
Leah Tolosa-Croucher, NCATS
Elizabeth (Liz) Ginexi, NCCIH
Steven Becker, NCI
Elizabeth (Liz) Glaze, NCI
Ron Johnson, NCI
Erin Lavik, NCI
Altaf Mohammed, NCI
Asif Rizwan, NCI
Martha Flanders, NEI
Gus Matute-Bello, NHLBI
Regina Bures, NHLBI
Jue Chen, NHLBI
Dina Paltoo, NHLBI
Rahul Thakar, NHLBI
Nandini Arunkumar, NIA
Tiziana Cogliati, NIA
Chhanda Dutta, NIA
Zane Martin, NIA
Suzana Petanceska, NIA
Larry Refolo, NIA
Fei Wang, NIA
Mark Egli, NIAAA
Liliana Brown, NIAID
Jim Cherry, NIAID
Candace Kerr, NIAID
Shilpa Kulkarni, NIAID
Melody Mills, NIAID
Reed Shabman, NIAID
Uday Shankar, NIAID
Aron Marquitz, NIAMS
Jermont Chen, NIBIB
Sai Majji, NICHD
Jagpreet Nanda, NICHD
Aaron Pawlyk, NICHD
Kathleen Borgmann, NIDA
Nancy Freeman, NIDCD
Dave Yeung, NIAID
Preethi Chander, NIDCR
William Cefalu, NIDDK
Albert Hwa, NIDDK
Warren Casey, NIEHS
Chris Duncan, NIEHS
David Fargo, NIEHS
Jacqui Marzec, NIEHS
Kim McAllister, NIEHS
Ravi Ravichandran, NIEHS
Yael Mandelblat-Cerf, NIMH
Sarah Woller, NINDS
Julia Bachman, NINDS
Joseph Monaco, NINDS
Grace Hwang, NINDS
Vamsi Kodali, NLM
Lauren Topper, NLM
Jessica Creery, OD
Matthew Arnegard, OD
Yanli Wang, ODSS
Sige Zou, ORIP
Oleg, Mirochnitchenko, ORIP
Janine Clayton, ORWH

Complement-ARIE Program Development Timeline

NIH Common Fund
Complement-ARIE Working Group

June: NIH Common Fund selects concept proposal and convened Complement-ARIE WG

June–October:
Program Planning/ Development

- **Deep landscape analysis**
  - data infrastructure needs
  - current use of NAMs
- **Listening sessions (roundtables)**
  - engage investigators and
  - current challenges in NAM development
- **Inter-agency workshop**
  - Shared interests with other stakeholders in the NAM space (Oct. 19-20)
- **Ideation/Design Prize**
  - engage community
  - identify opportunities in NAM development, validation, and adoption

Nov - Jan:
Concept refinement and approvals for continued development and implementation

- ICD presentation (**Dec 21, 2023**)
- Council of Councils (**January 25, 2024**)

June 2023
July 2023
August 2023
Sept 2023
Oct 2023
Nov 2023
Dec 2023
Jan 2024

NIH ACD Working Group on Catalyzing the Development and Use of NAMs to Advance Biomedical Research

June 8-9 ACD WG present preliminary findings

June – November:
ACD WG Stakeholder Engagement

Expert Workshop on "Catalyzing Development and Use of Novel Alternative Methods – August 21-22 (videocast)

RFI published:
https://grants.nih.gov/grants/guide/notice-files/NOT-OD-23-140.html
Closed September 5

December 14
ACD WG present final report w/recommendations

February 2, 2024
NIH Director accepts Recs

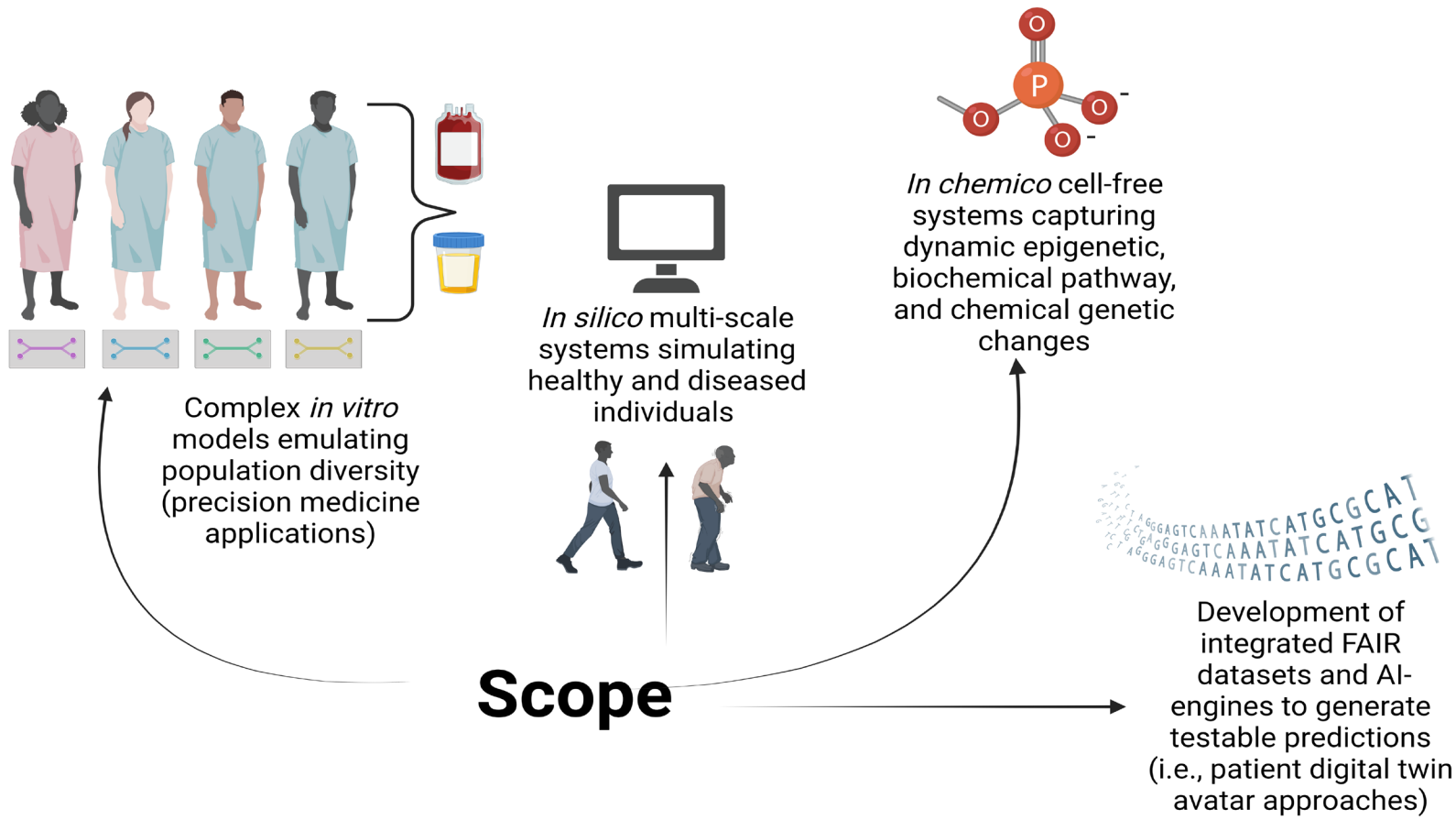
NIH National Center for Advancing Translational Sciences

Complement-ARIE Program: Major Work Products

Program Goals:

NAMs that incorporates the following features:

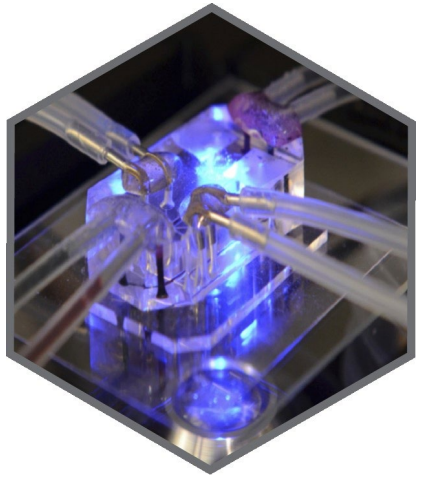
- Complex ***in vitro*** **models** emulating population diversity
- ***In silico*** **multi-scale systems** simulating healthy/diseased individuals
- ***In chemico*** **cell-free systems** capturing dynamic changes
- **Combinatorial NAMs** and integrated **FAIR datasets and AI-engines** for all NAMs



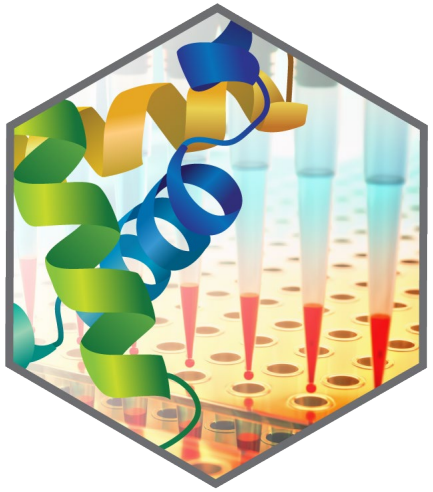
Build on NAMs activities across NIH

Digital Twin Models
Digital Twins for treatment of cancers and neuropsychiatric diseases, host-gut microbiome studies

In Silico Models
In silico and ML/AI models for neurodegenerative disease, wound healing, learning/behavior, SARS-CoV-2 propagation, many other diseases



Complex In Vitro Systems
MPS and 3D organoid models for multiple tissues, organs and disease conditions



In Chemico Screening
Tox21 high-throughput studies, biochemical assays for skin irritation, ocular toxicity

Strategic planning activities: Stakeholder outreach

- 3 listening sessions were held with major stakeholders (**Academia, Industry, NGO, Government, International**)
- Federal Inter-agency retreat Oct 19-20, NIH/Natcher
  - **NIH, FDA, EPA, NSF, ARPA-H, BARDA, VA, DARPA, NIST, NASA, CPSC, ICCVAM**
- Scientific Needs: *Innovate and Transform*
  - ***Chronicity***
  - ***Neuroscience***
  - ***Personalized health***
  - ***Cross-disease pathogenesis***
  - ***Population diversity***

- Operational Needs: *Integrate, Coordinate, and Collaborate*
  - ***Shared data infrastructure***
  - ***Standardized frameworks***
  - ***Validation***
  - ***Training***
- Other strategic planning activities informing concept development:
  - Landscape Analysis, Ideation Challenge Prize

Complement-ARIE Concept Prize Competition

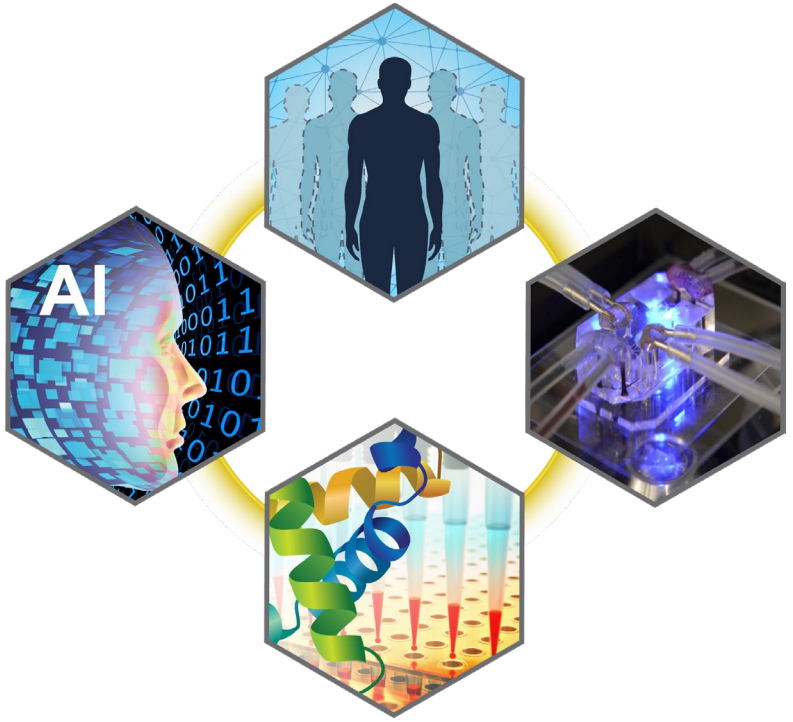
The NIH is conducting planning activities to inform a Common Fund research program to **Complement Animal Research In Experimentation (Complement-ARIE)** by catalyzing the development, standardization, validation, and use of New Approach Methodologies (NAMs)

The Common Fund issued the Complement-ARIE Challenge Prize Competition to solicit entries for new methods and approaches in NAMs. Winning solutions provided NIH with information about where innovation can be incorporated into NAMs and what types of new NAMs may benefit from further investment.

Twenty Complement-ARIE Challenge prize winners will share the total prize purse of $1,000,000, with each winning team receiving $50,000 for their innovative solutions.

View the winners on the NIH Common Fund website:
https://go.nih.gov/Complement-ARIEPrizeWinners

Join the Complement-ARIE listserv: go.nih.gov/ComplementARIE_listserv



Link to Complement-ARIE Challenge winner announcement

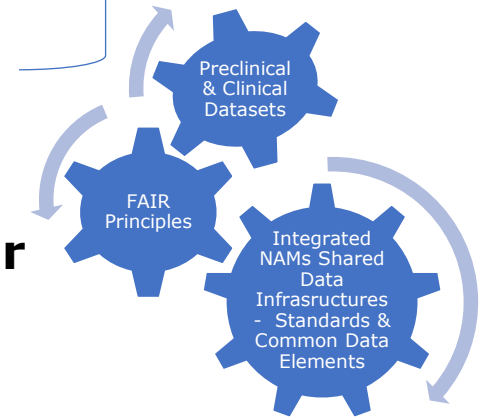
Complement-ARIE: Program Structure

- ***Technology Development Centers*** – stimulate the development of NAMs to fill in areas of greatest need, with emphasis on increased biological complexity and throughput, innovative combinatorial approaches, and data sharing.
- ***NAMs Data Hub & Coordinating Center (NDHCC)***– create integrated data structures, including standards for model credibility, improve FAIRness (Findability, Accessibility, Interoperability, and Reusability) of NAM-relevant data, create searchable NAMs repository.
- ***Validation and Qualification Network (VQN) for NAMs Adoption and Implementation*** – establish common data elements and standardized reporting, apply validation/qualification frameworks, accelerate deployment and regulatory implementation of NAMs.
- ***Community Engagement and Training*** – *promote the development of an inclusive, diverse biomedical research workforce with the skills to build/use new NAMs, community engagement, societal and ethical considerations.*
- ***Strategic Engagement*** – *set aside ~2-5% of program funds to dynamically engage with emerging opportunities*

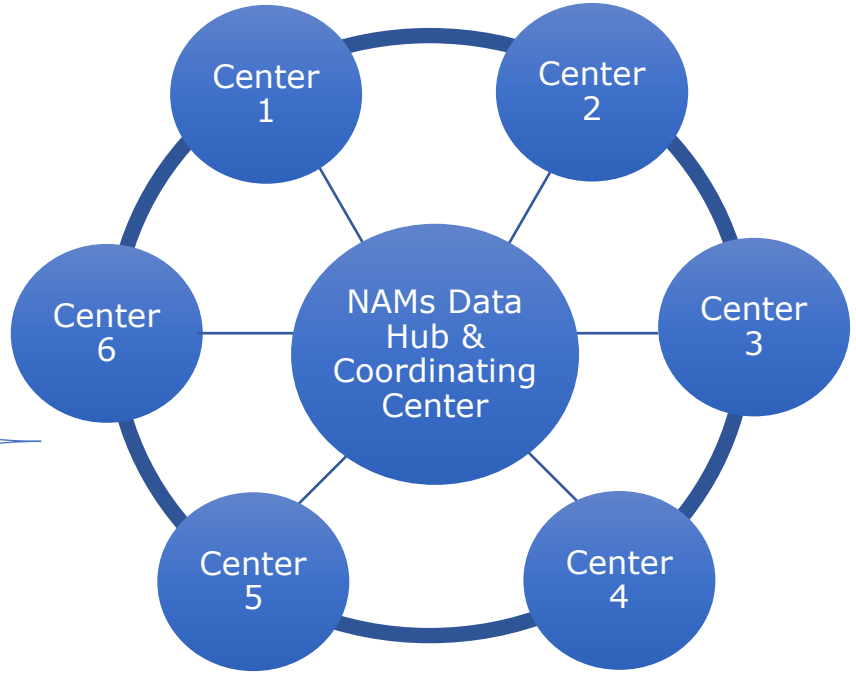
Complement-ARIE Consortium

NAMs Center Activities

NAMs Data Hub & Coordinating Center (NDHCC)



NAMs Comprehensive Technology Development Centers



Validation and Qualification Network (VQN) for NAMs Adoption and Implementation

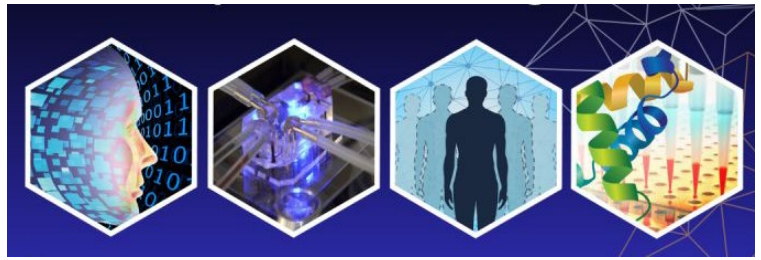
- ICCVAM/Federal Partners
- Regulatory Partners
- Industry Partners
- International
- Non-Profits
- Others

Potential NIH-FNIH Public-Private Partnership

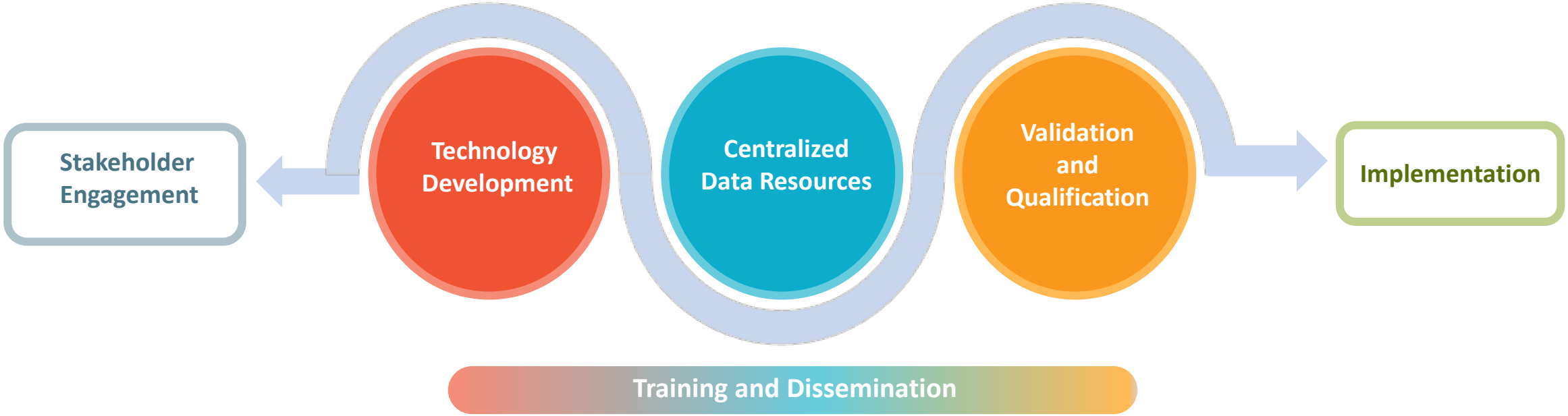
Validation network for regulatory implementation

Work with comprehensive centers and NDHCC to establish common data elements and standardized reporting, apply validation/qualification frameworks, accelerate deployment and regulatory implementation of NAMs

- Exploring an NIH-FNIH PPP to bring industry, NGOs, non-profits, etc into the network leveraging existing FNIH PPP infrastructure
- Pre-competitive data sharing and potentially supporting validation activities across labs and locations for specific use cases for implementation
- Support community outreach and training
- Provide a fluid funnel for potential solutions which may be developed through the comprehensive centers
- Include additional Federal partners
- Synergize and coordinate with other global activities on NAMs

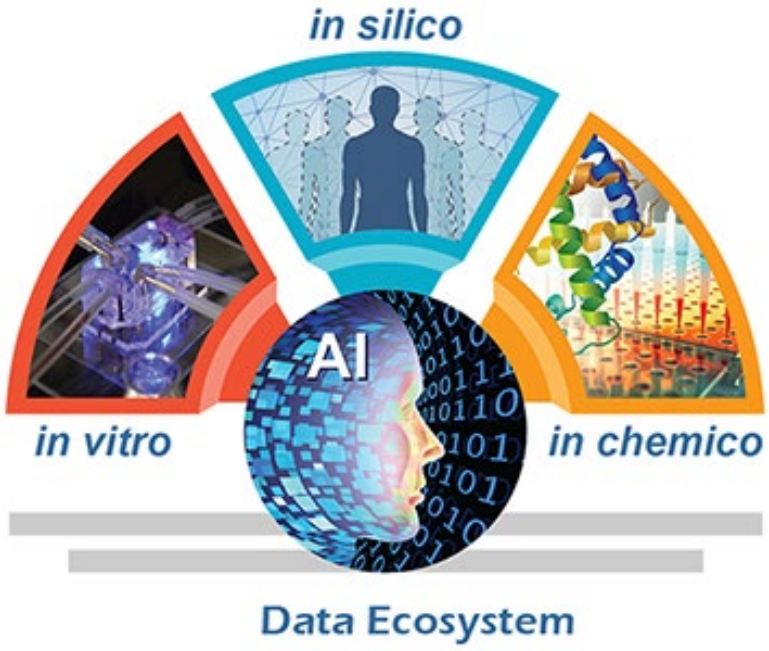


Complement-ARIE: Program Flow Diagram



The diagram illustrates the **key components of the Complement-ARIE program** including technology development, centralized data resources, Validation and Qualification, along with key training and dissemination activities to provide a **fluid conduit from stakeholder engagement to implementation**.

Complement-ARIE: Innovate, Integrate, Coordinate, and Transform



- **Innovate** understanding of human health and disease pathways across diverse populations
- **Integrate** innovative NAMs (*in vitro, in chemico, and in silico*) with AI and FAIR data ecosystems
- **Coordinate** with ICs, agencies, and public-private partnerships
- **Transform** the way we do basic, translational, and clinical sciences by leveraging the full scientific toolbox

Questions/Discussion

To learn more about Complement-ARIE Program, visit:
https://commonfund.nih.gov/complementarie

National Institutes of Health
Office of Strategic Coordination–The Common Fund