# Common Fund Data Ecosystem Phase 2 Concept Clearance

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# OSC (Common Fund)

**Concept Clearance:** Phase 2 Common Fund Program

**Title: Common Fund Data Ecosystem (CFDE)**

**Aims:**

1. Enable users to **query across & use** multiple CF data sets
    a. Data Resource Portal
    b. Knowledge Portal
    c. Cloud Workspace
2. **Training and outreach** to bring people to CF data, and train them to work in the cloud through five sub-initiatives:
    a. Center for Training
    b. Training Fellowships
    c. Course Development and Delivery
    d. Diversity Supplements
    e. Pilot Projects Enhancing Utility of Common Fund Data
3. **Coordinate and integrate** infrastructure and activities into a cohesive ecosystem
    a. Integration and Coordination Center

**Funds Available:** $23M per year

**Program Duration:** 5 years

**Council Action:** Vote for approval of the concept for Common Fund Data Ecosystem

# CFDE CoC Working Group –
## Key Observations and Recommendations

- The goals of the CFDE are important to continue.

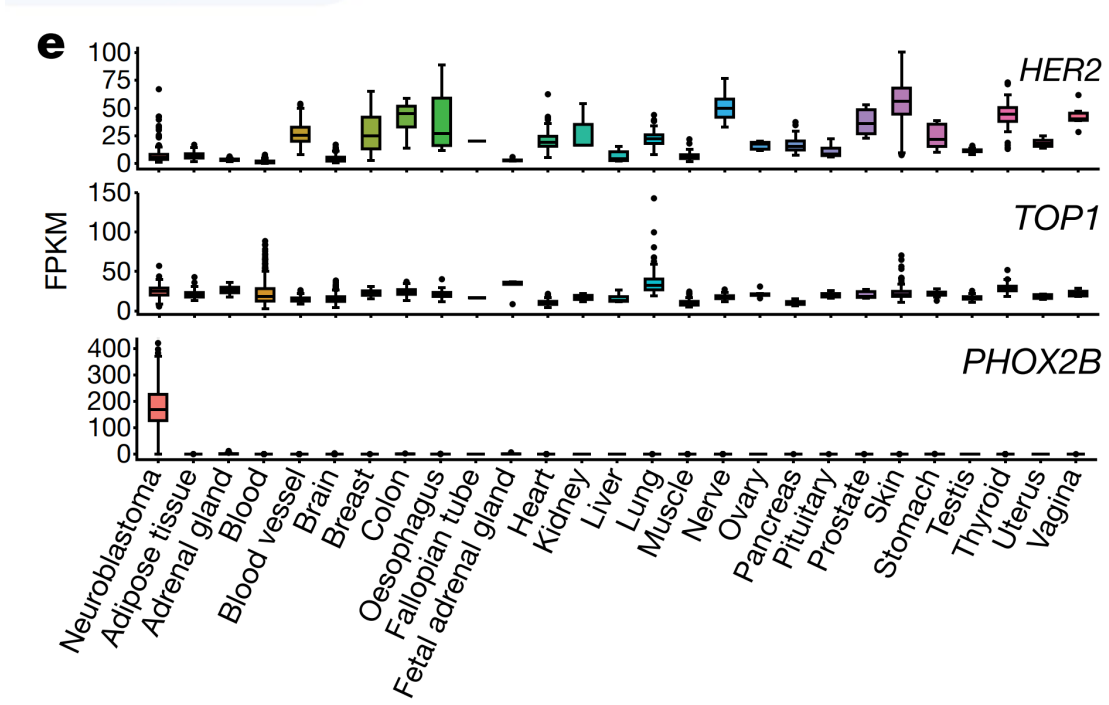
- CFDE has made substantial progress in its initial phase; it has a solid foundation to continue future work.

- CFDE challenges are common to data science, particularly concerning sustainability of data and resources and inter-operating across platforms
  - Partner with extant repositories for data storage
  - Partner with ODSS, ICs, and other agencies to build toward interoperability

- Transition to cloud computing is important but challenging: Increase and diversify training and outreach initiatives

- The chief metric of success is discovery: If the CFDE is successful, in five years many investigators will be using Common Fund data for new discoveries and new purposes.

# Drug targets for neuroblastoma




[Yarmarkovich et al., 2021, Nature *599*, 477]

- Can I find gene expression of neuroblastoma cohorts?

Gabriella Miller Kids First PEDIATRIC RESEARCH PROGRAM

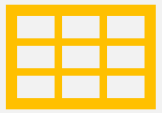
- Can I conduct differential expression analysis with normal tissue?

GTEx

# Challenges of Data Wrangling

Find and access the data

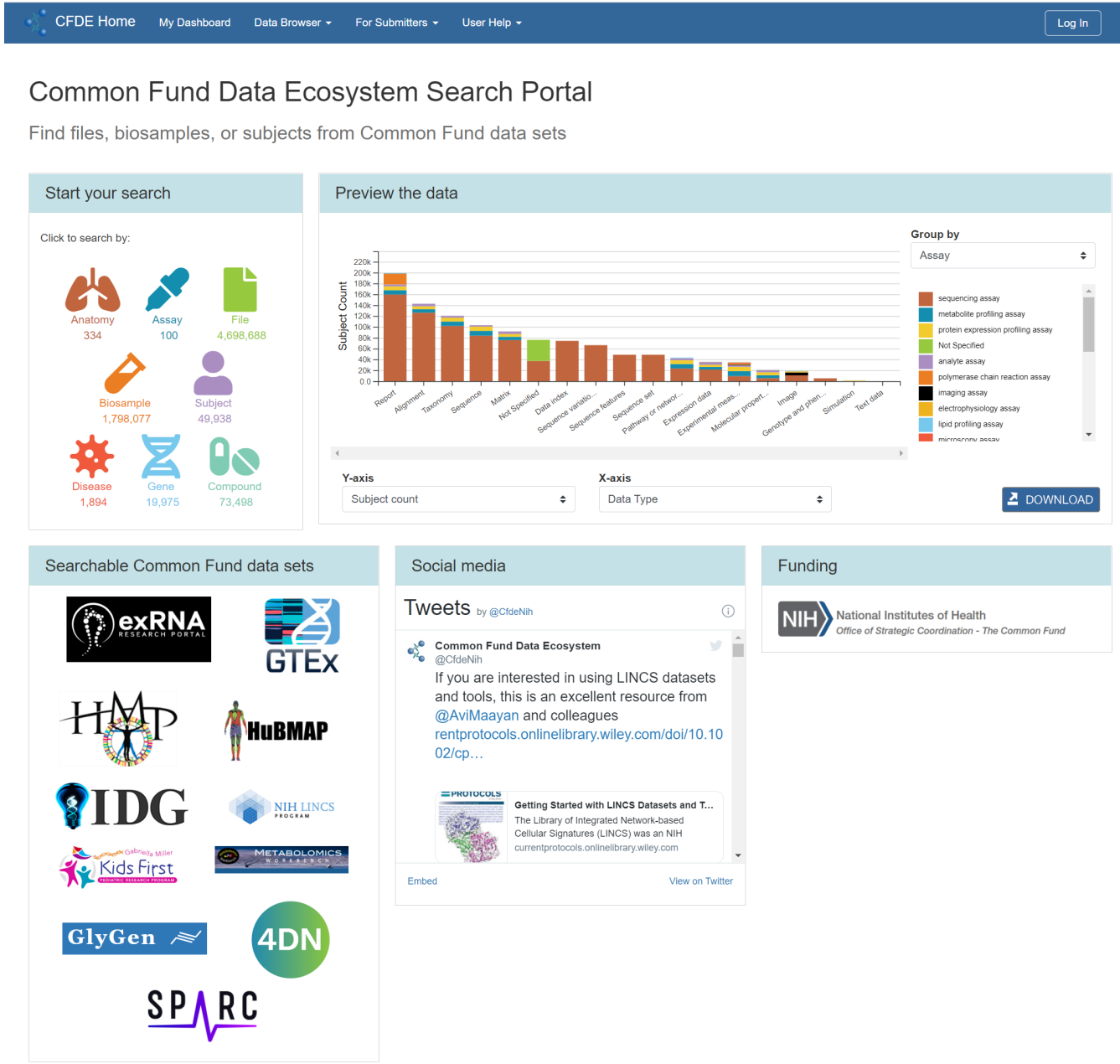
Harmonize files into one data set



Create and analyze cross-cohort tables

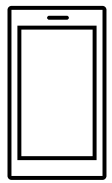
# How to find and access the data?

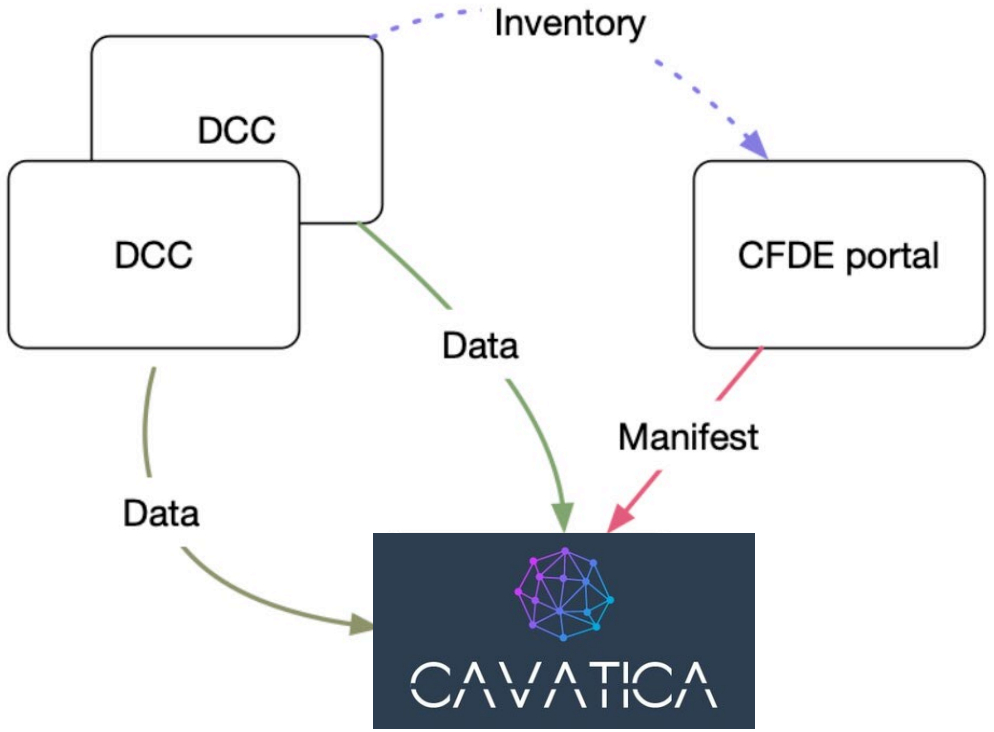
- CFDE Search Portal
- CAVATICA cloud workspace

# Harmonization and analysis

- Establish common pipelines (e.g., RNA seq)
- Appyters for creating and analyzing standard tables
- More details are available here





# Accelerating and democratizing discovery

~18 months

~3 hours

296 (0.48%) genes with minimum LogFC > 1 and p < 0.01

33 (11%) genes predicted to be membrane associated

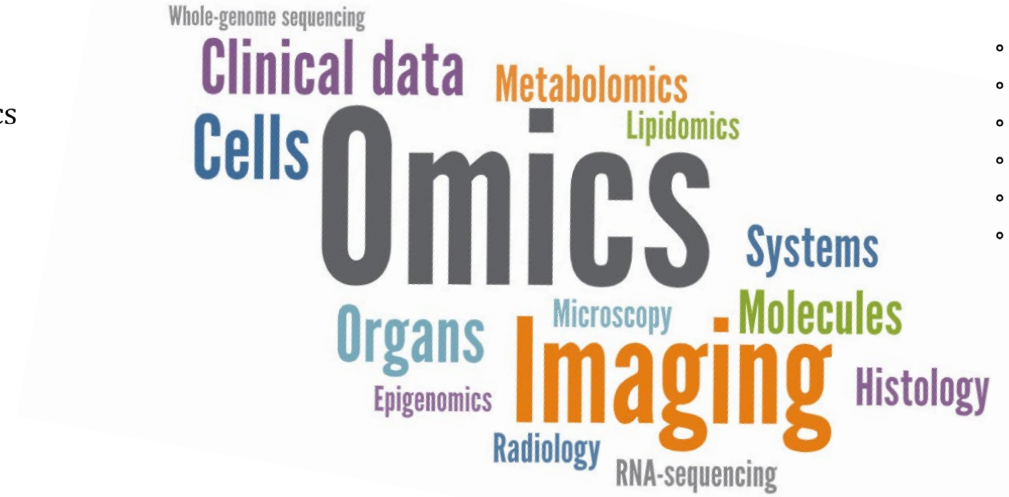
6 genes with high absolute RNA expression (FPKM > 50)

PHOX2B, TH, IGFBPL1, CHRNA3, HMX1, GFRA2

# CF Programs Generate a Wide Array of Data Types

**Catalytic Data Resources (CDR)**

- Bridge2AI
- CFDE
- HuBMAP
- Kids First
- Metabolomics



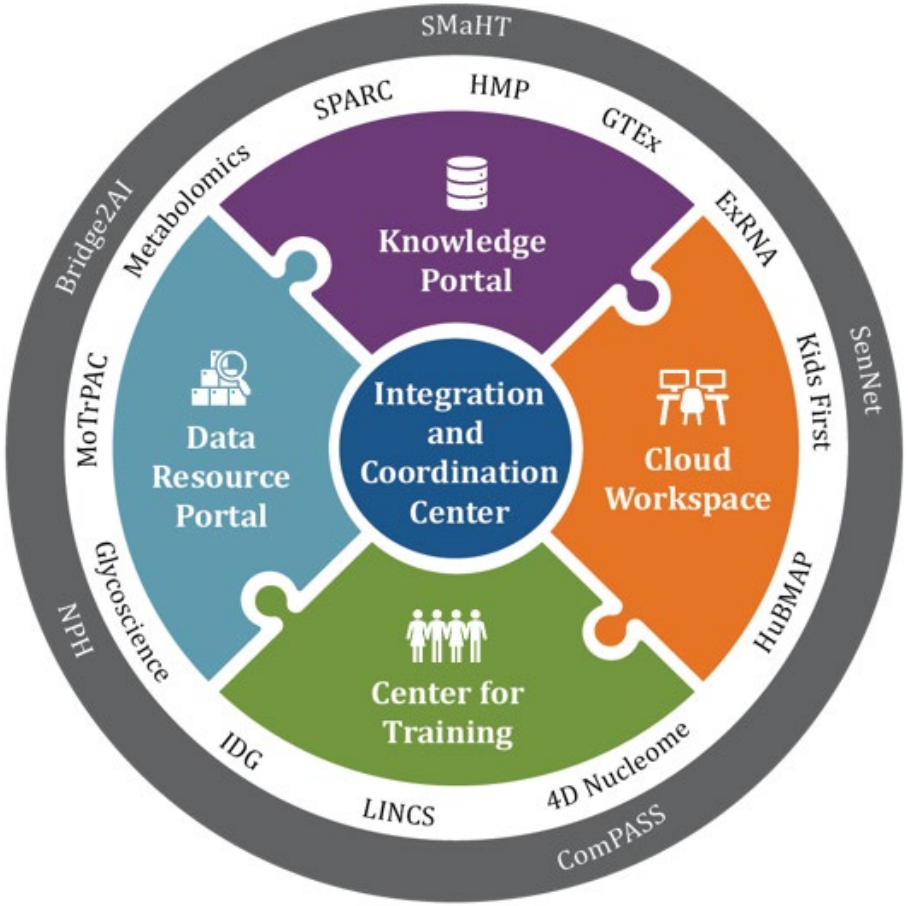

**Transformational Science and Discovery (TSD)**

- 4D Nucleome
- A2CPS
- CryoEM
- DS-I Africa
- ExRNA
- Global Health
- Global Health
- Glycoscience
- HRHR
- IDG
- KOMP2
- MoTrPAC
- NPH
- SMaHT
- SPARC

**Re-Engineering the Research Enterprise (RRE)**

- DPC
- FIRST
- SCGE
- Transformative Research to Address Health Disparities and Advance Health Equity
- UDN

# Proposed Structure of CFDE in Phase II




- 5 interconnecting components
- Continued engagement with DCCs
- Enhancing findability and accessibility of data
- Integration and Coordination Center ensures cohesion and collaboration
- Increased emphasis on training and outreach
  - Center for Training will coordinate with awardees supported by 4 additional Training/Outreach initiatives, bringing them into the ecosystem

# Portals for Data and Knowledge Resources

- Create two portals for users to **query across CF programs**
  - Data: Data files and tools
  - Knowledge: Integrated information and knowledge
- Interconnected portals
- Cohesive interface
- Potential to merge into a single portal as they mature

*Success Metric: Robust and growing user community for the search and knowledge portal(s), with enhanced utility over time*

# Cloud Workspace

- Enable users to import their own data to co-analyze with CF data and resources
- Leverage existing solutions
- Serve both novice and expert users
- Perform mid-cycle review

*Success Metric: Robust and growing user community, growth in the tools and capabilities to facilitate analysis*

# Training and Outreach

5 sub-initiatives that will grow and diversify the CF data user-base

1. **Center for Training (Training)**: Scalable course work to address unmet needs, coordinate across all training sub-initiatives
2. **Training Fellowships (Training)**: Two-year diversity fellowships aimed at supporting trainees interested in reusing CF data (4x)
3. **Course Development and Delivery (Training)**: Design and implement 2-3 courses with rigorous evaluation; Target diverse early career investigators to enable them to build research projects around cloud computing using CF data resources (2x)
4. **Diversity Supplements (Outreach)**: Partner with ICOs to support reuse of CF data (5x)
5. **Pilot Projects Enhancing Utility of Common Fund Data (Outreach)**: Promote the reuse of datasets and resources from multiple CF programs (5x)

*Success Metric: Uptake of trainings, growth in the number of investigators using CF data and resources*

# Integration & Coordination Center

*The ICC will focus on ensuring internal cohesion within the program and implementing a structured evaluation process to ensure a continuous cycle of improvement*

The Integration & Coordination Center will have three major responsibilities:

1. Integration & Coordination
2. Sustainability Services
3. Evaluation

*Success Metric: Cohesive program with an annual evaluation process to drive continuous improvement*

# Budget Request for Phase II

*(numbers in 000,000)*

| Initiative | FY23 | FY24 | FY25 | FY26 | FY27 | Total |
|---|---|---|---|---|---|---|
| Data Portal | $1.75 | $1.75 | $1.75 | $1.5 | $1.25 | $8 |
| Knowledge Portal | $1.25 | $1.5 | $1.75 | $2 | $2.25 | $8.75 |
| Workspace | $0.75 | $1.5 | $1.5 | $1.5 | $1.5 | $6.75 |
| Training & Outreach | $7 | $7.9 | $7.7 | $7.7 | $7.1 | $37.4 |
| Integration | $1.5 | $2.25 | $2 | $2 | $2 | $9.75 |
| DCC Engagement | $8 | $8 | $8 | $8 | $8 | $40 |
| RMS | $0.2 | $0.2 | $0.2 | $0.2 | $0.2 | $1 |
| Total | $20.45 | $23.1 | $22.9 | $22.9 | $22.3 | $111.65 |

# Council Action:
# Vote for approval of the concept renewal for Common Fund Data Ecosystem

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