

DCB and NCI Resources for Researchers

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Cancer Cell Biology Branch

Division of Cancer Biology

DCB Annual New Grantee Workshop

January 24, 2024

DCB and NCI Resources for Researchers

Experimental Resources



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Experimental Resources

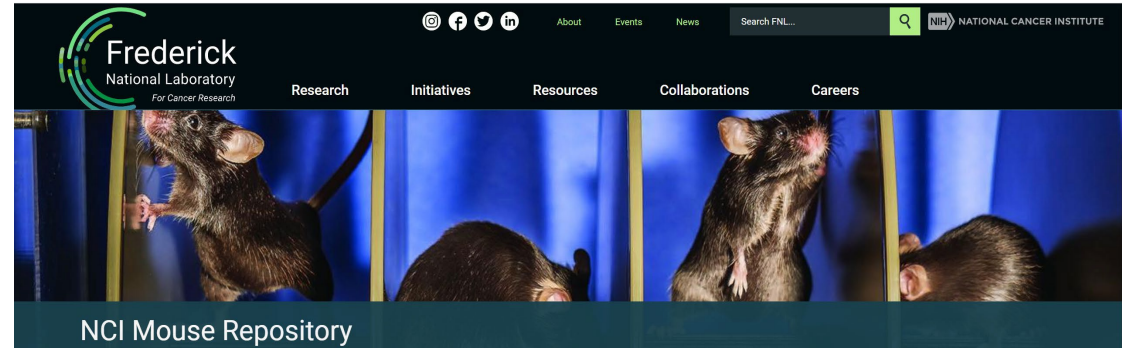


Animal Models, Cell Lines,
Reagents, Instrumentation, etc.

NCI Mouse Repository

Mouse Cancer Models (>500 currently)

- Mice are cryopreserved
- Request frozen embryos or sperm
- Researchers are encouraged to submit their cancer models to the NCI Mouse Repository for archiving and distribution



miRNA Embryonic Stem Cell Collection (>1,500 cell lines)

- ES cells overexpressing microRNA
- MicroRNAs are GFP labeled
- microRNA expression is inducible

<https://frederick.cancer.gov/resources/repositories/nci-mouse-repository>

MouseRepository@mail.nih.gov

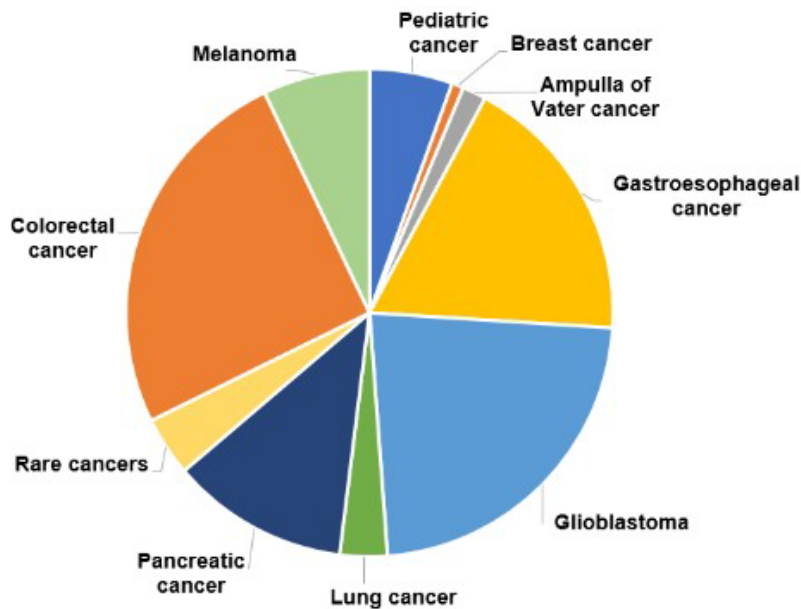
Also of note: NIH-funded [Mutant Mouse Resource & Research Centers](https://www.mmrrc.org)
<https://www.mmrrc.org>

[Rat Resource and Research Center \(RRRC\)](https://www.rrrc.us)
<https://www.rrrc.us>

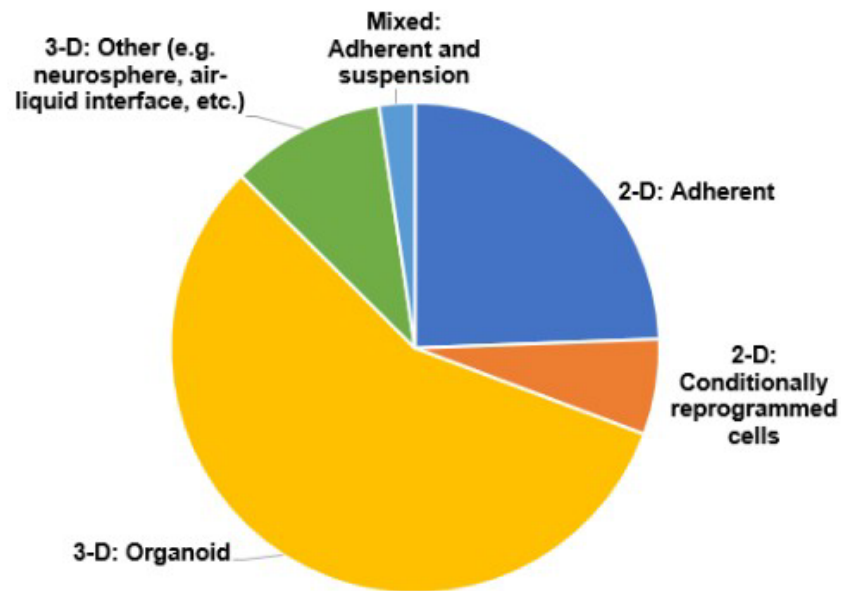
HCMI: Human Cancer Models Initiative

Patient-derived **cancer models** and **case-associated data** are available to researchers as a community resource.

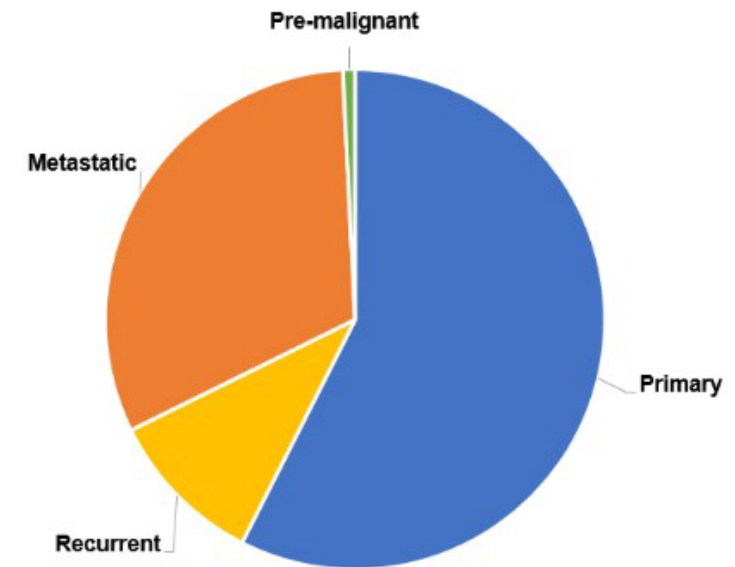
Available **Cancer Types**



Available **Model Types**



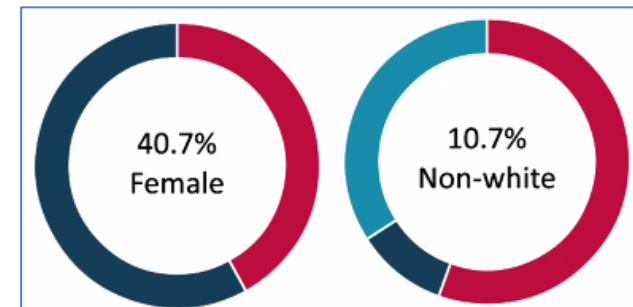
Available **Tissue Types**



There are **300** models available through ATCC as of Dec 2023

NCI, Cancer Research UK, Wellcome Sanger Institute, Hubrecht Organoid Technology

<https://hcmi-searchable-catalog.nci.nih.gov/>



Developmental Therapeutics Program (DTP)

- **Repository of Chemical Agents**

Small Molecules and Isolated Natural Products: More than 200,000 **synthetic compounds** and pure natural products for non-clinical research purposes

- **Repository of Natural Products**

170,000 **extracts** from samples of more than 70,000 plants and 10,000 marine organisms collected from more than 25 countries, more than 30,000 extracts of diverse bacteria and fungi



- **Repository of Biologicals** - Monoclonal Antibodies, Cytokines and Cytokine Standards
- **Repository of Tumors and Tumor Cell Lines** (e.g., NCI-60): Transplantable *in vivo*-derived tumors and *in vitro*-established tumor cell lines from various species

<https://dtp.cancer.gov/repositories/default.htm>

ncidtpinfo@mail.nih.gov

NCI Cryo-Electron Microscopy Facility

- Facility to provide cryo-EM images collected on state-of-the-art instruments to academic users who can show that they have specimens of the required quality **ready for imaging at high resolution**
- Titan Krios microscope facility, where users can apply for a 48-hour imaging session of up to two different samples that will be loaded at one time together for each session

<https://www.cancer.gov/research/resources/cryoem/access>



Also of note:

[NIH Common Fund Transformative High Resolution Cryo-Electron Microscopy Program](https://www.cryoemcenters.org)
<https://www.cryoemcenters.org> of **National CryoEM and CryoET Centers**

Access to **screening**, high resolution **data collection service**, and **cross-training**

Other Experimental Resources

➤ NIH Tetramer Core

- Provides major histocompatibility complex (MHC) tetramers and related **reagents for the detection of T cell responses**; no charge

<https://tetramer.yerkes.emory.edu/>

➤ BEI Resource Repository

- organisms and reagents for **microbiology and infectious diseases research** free of charge (bacterial cultures, viral isolates, reagents)

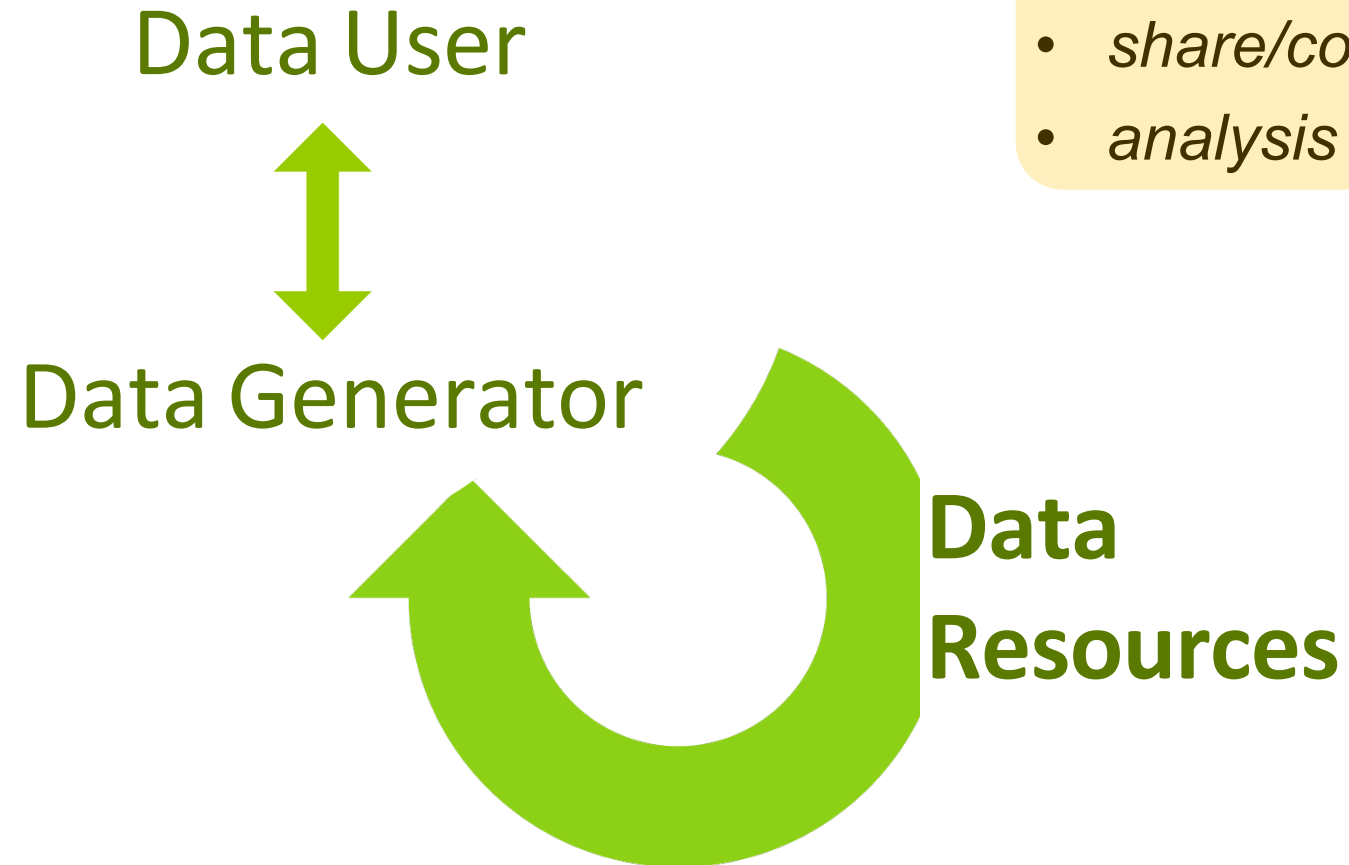
<https://www.beiresources.org/Catalog.aspx>

➤ Biopharmaceutical Development Program

- offers resources for and expertise in the development of **investigational biological products** for cancer, rare diseases, AIDS, and infectious diseases applications.
- Proposed **collaborations** are reviewed and approved by the NCI using cooperative agreements.

<https://frederick.cancer.gov/research/biopharmaceutical-development-program>

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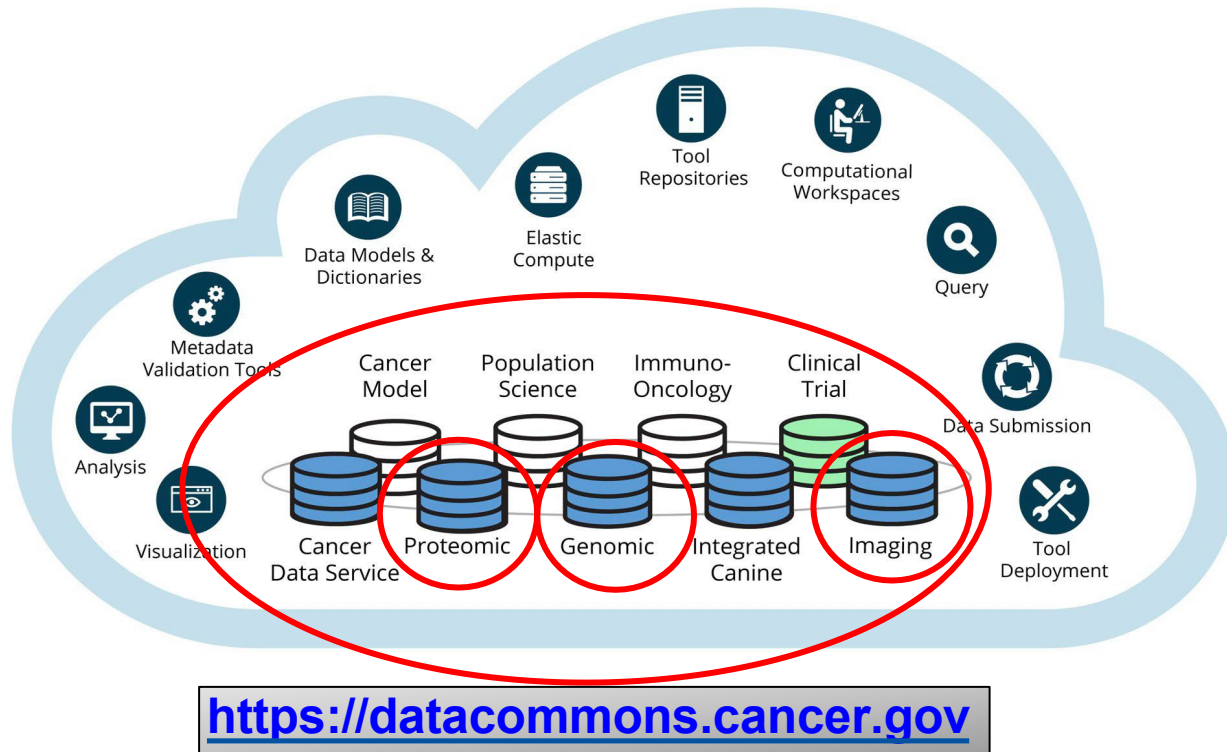
- *access*
- *share/compare*
- *analysis tools*

Surveillance, Epidemiology, and End Results Program (SEER)

- Provides information on **cancer statistics** monitoring U.S trends and support cancer research.
- Cancer data from registries covering nearly 50% of the U.S. population
- SEER is managed by the Surveillance Research Program (SRP) in the Division of Cancer Control and Population Science (DCCPS), NCI
- Data includes **cancer incidence and population data** associated by age, sex, race, year of diagnosis, and geographic areas
- With NCI, ACS and NAACCR, jointly issues the **Annual Report to the Nation on the Status of Cancer** https://seer.cancer.gov/report_to_nation/

<https://seer.cancer.gov>

Cancer Research Data Commons (CRDC)



- Data are stored in domain- or program-specific **Data Repositories**.
 - Genomic Data Commons (includes **TCGA** Data)
<https://portal.gdc.cancer.gov>
 - Proteomic Data Commons (includes **CPTAC** Data)
<https://pdc.cancer.gov/pdc>
 - Imaging Data Commons (includes **TCIA** Data)
<https://portal.imaging.datacommons.cancer.gov>
- **NCI Cloud Resources** provide compute capability for the users of CRDC data
- Researchers can combine their own data and tools with CRDC data for integrative analysis

New

MOPAW ([Multi-Omics Pathway Workflow](#)), a new point-and-click interface to analyze your own multi-omics data or public data sets

Cancer Moonshot Data Resources

NIH NATIONAL CANCER INSTITUTE

1-800-4-CANCER Live Chat Publications Dictionary

ABOUT CANCER CANCER TYPES RESEARCH GRANTS & TRAINING NEWS & EVENTS ABOUT NCI search

Home > Research > Key Initiatives > Cancer Moonshot™

CANCER MOONSHOT™

- Blue Ribbon Panel
- Research Initiatives**
 - Direct Patient Engagement Network
 - Adult Immunotherapy Network
 - Pediatric Immunotherapy Network
 - Drug Resistance Network
 - National Cancer Data Ecosystem
 - Drivers of Childhood Cancers
 - Symptom Management
 - Hereditary Cancers
 - Prevention & Early Detection Strategies
 - Retrospective Analysis of Biospecimens
 - Human Tumor Atlas Network
 - New Enabling Cancer Technologies
- Seminar Series
- Funding Opportunities

Cancer Moonshot™ Research Initiatives

Following receipt of the [Blue Ribbon Panel \(BRP\)](#) report, and the authorization of the 21st Century Cures Act, the NCI established implementation teams that align with each of the BRP recommendations. The teams have identified opportunities and developed initiatives for funding that directly address each of the recommendations. These mark the beginning of a Cancer Moonshot portfolio that will continue to be expanded in future years.

The following initiatives have been established to address the goals of the recommendations:

- Establish a Network for Direct Patient Engagement**
Engage patients to contribute their comprehensive tumor profile data to expand knowledge about what therapies work, in whom, and in which types of cancer.
- Create an Adult Immunotherapy Network**
Establish a cancer immunotherapy research network to develop immune-based approaches for the treatment and prevention of cancer in adult patients.
- Create a Pediatric Immunotherapy Discovery and Development Network (PI-DDN)**
Generate a cancer immunotherapy research network to overcome challenges in the development of immunotherapies for childhood cancers.
- Develop Ways to Overcome Cancer's Resistance to Therapy**
Identify therapeutic targets to overcome drug resistance through studies that determine the mechanisms that lead cancer cells to become resistant to previously effective treatments.
- Build a National Cancer Data Ecosystem**
Create a national ecosystem for sharing and analyzing cancer data so that researchers, clinicians and patients will be able to contribute data, which will facilitate efficient data analysis.
- Intensify Research on the Major Drivers of Childhood Cancers**
Improve our understanding of fusion oncoproteins in pediatric cancer and use new preclinical models to develop inhibitors that target them.
- Minimize Cancer Treatment's Debilitating Side Effects**
Accelerate the development of guidelines for routine monitoring and management of patient reported symptoms to minimize debilitating side effects of cancer and its treatment.
- Prevention and Early Detection of Hereditary Cancers**
Improve current methods and develop new strategies for the prevention and early detection of cancer in individuals at high risk for cancer.
- Expand Use of Proven Cancer Prevention and Early Detection Strategies**
Reduce cancer risk and cancer health disparities through the development, implementation, and broad adoption of proven cancer prevention and detection approaches.
- Retrospective Analysis of Patient Data and Biospecimens from Past Clinical Trials to Predict Future Patient Outcomes**
Predict response to standard treatments through retrospective analysis of patient specimens.
- Generation of Human Tumor Atlases**
Create dynamic 3D maps of human tumor evolution to document the genetic lesions and cellular interactions of each tumor as it evolves from a precancerous lesion to advanced cancer.
- Develop New Enabling Cancer Technologies**
Develop new enabling cancer technologies to characterize tumors and test therapies.

HTAN
HUMAN TUMOR ATLAS NETWORK

Human Tumor Atlas Network

3D Atlases (cellular, morphological, molecular features) precancer-to-advanced disease

14	66	1703	6292
Atlases	Organs	Cases	Biospecimens

→ **CRDC**

<https://humantumoratlas.org/>

IOTN
Immuno-Oncology
Translational Network

**IOTN Data
Sharing Catalog**

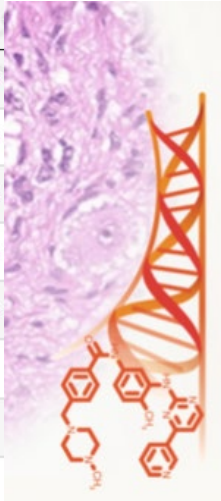
<https://www.cancer.gov/research/key-initiatives/moonshot-cancer-initiative>

<https://www.iotnmoonshot.org/en/resources/data-sharing-catalog/>

NCI Data Resources

CTD² Data Portal (Cancer Target Discovery and Development)

Center Name	Submissions
Broad Institute	26 submissions
Cold Spring Harbor Laboratory	15 submissions
Columbia University	40 submissions
Dana-Farber Cancer Institute	34 submissions
Emory University	23 submissions
Fred Hutchinson Cancer Research Center (1)	8 submissions
Fred Hutchinson Cancer Research Center (2)	3 submissions
Oregon Health and Science University (2)	7 submissions
Stanford University	10 submissions
Translational Genomics Research Institute	4 submissions
University of California San Diego	3 submissions
University of California San Francisco (1)	11 submissions
University of California San Francisco (2)	8 submissions
University of Texas MD Anderson Cancer Center	12 submissions
University of Texas Southwestern Medical Center	7 submissions



Cancer Systems Biology Consortium (CSBC)

<https://www.cancer.gov/about-nci/organization/dcb/research-programs/csbc>

Physical Sciences - Oncology Network (PS-ON)

<https://physics.cancer.gov>



Cancer Complexity Knowledge Portal

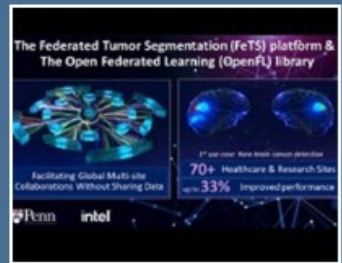
<https://www.cancercomplexity.synapse.org/>

<https://ocg.cancer.gov/programs/ctd2/data-portal>

Data Analysis Tools

NCI Informatics Technology for Cancer Research

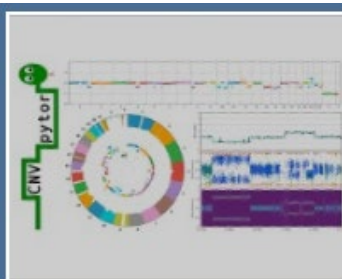
Supporting Informatics Needs Across the Cancer Research Continuum



FeTS



Globus



CNVpytor

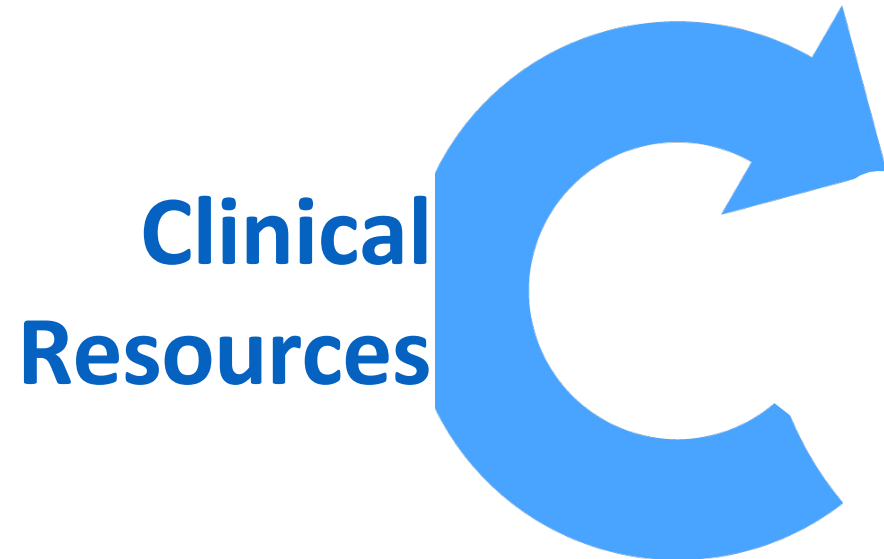
Introductory videos to many of the ITCR tools available

partial list..

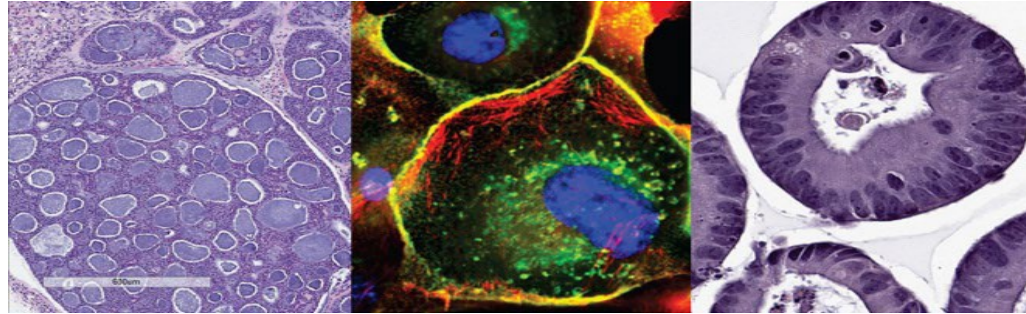
Title	Category	URL
DINC 2.0	-omics	https://dinc.kavrakilab.org/help/
SlicerDMRI	Imaging	http://dmri.slicer.org/videos/
FHIR ShEx	Data Standards	
THRIVE	Imaging	https://www.youtube.com/channel/
The Cancer Imaging Archive (TCIA)	Imaging	https://vimeo.com/200254396
QIIME2	-omics, Network Biology	
Trinity	-omics	
Federated Tumor Segmentation (FeTS)	Imaging	
PDX Finder	-omics	
CNVnator/CNVpytor	-omics	
A high-level introduction to QIIME	-omics, Network Biology	
What is Globus?	Imaging, -omics, Clinical, Data Standards, Network Biology	https://vimeo.com/437243813
CaPTk Introductory Video	Imaging	
CIVIC	-omics, Clinical	
The Cancer Proteome Atlas Portal (TCPA)	-omics	
IGV	-omics	
XNAT	Imaging	
Galaxy P multi-omics	-omics	http://bit.ly/2X2luxB
XNAT Imaging Informatics Platform	Imaging	

<https://itcr.cancer.gov/informatics-tools>

NCI Resources for Researchers



Patient-Derived Models Repository (PDMR)



A national repository of Patient-Derived Models (PDMs) from primary and metastatic tumor tissues and blood specimens supplied by NCI-supported clinical trials, research programs and Cancer Centers.

- Patient-derived xenografts (PDX)
- Patient-derived tumor cell cultures (PDC)
- Cancer-associated fibroblasts (CAF)
- Patient-derived organoids (PDOrg)

[364 available]

[367]

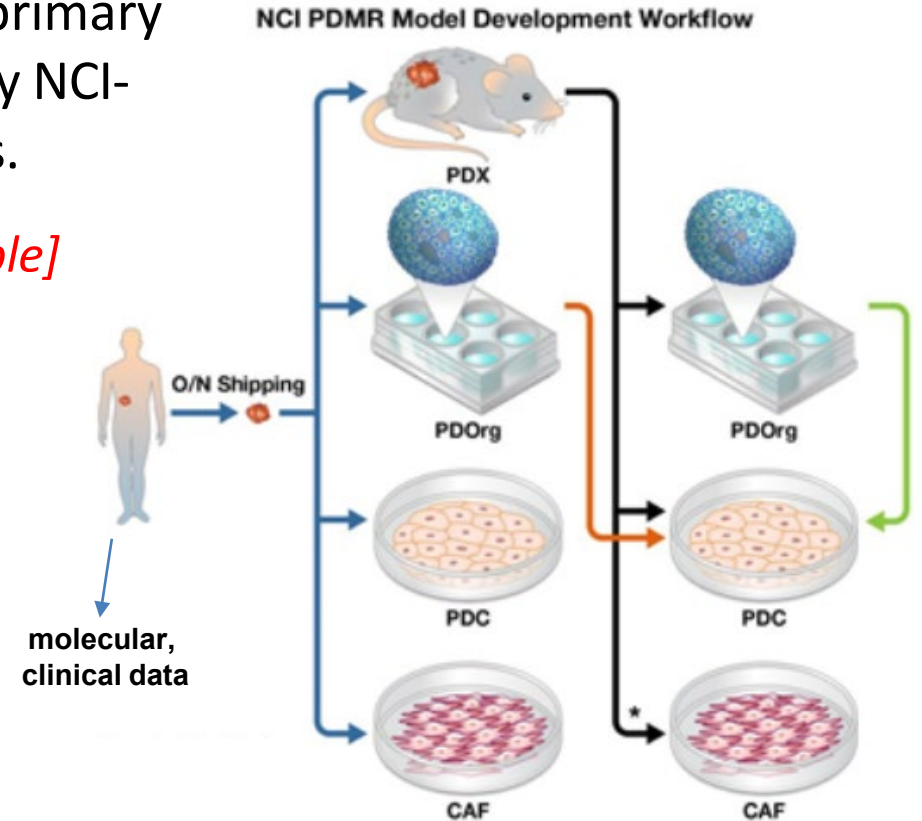
[384]

[350]

☐ **>280 Model Sets with PDX : PDOrg : PDC**

<https://pdmr.cancer.gov>

[NCI PDM Repository@mail.nih.gov](mailto:NCI_PDM_Repository@mail.nih.gov)

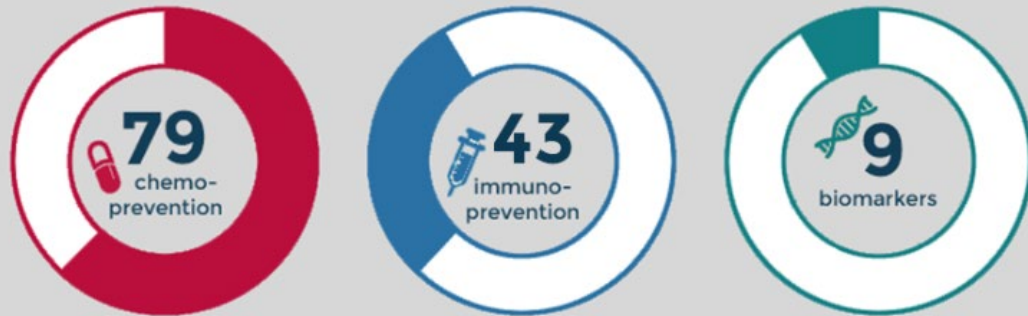


PREVENT Cancer Preclinical Drug Development Program (PREVENT)

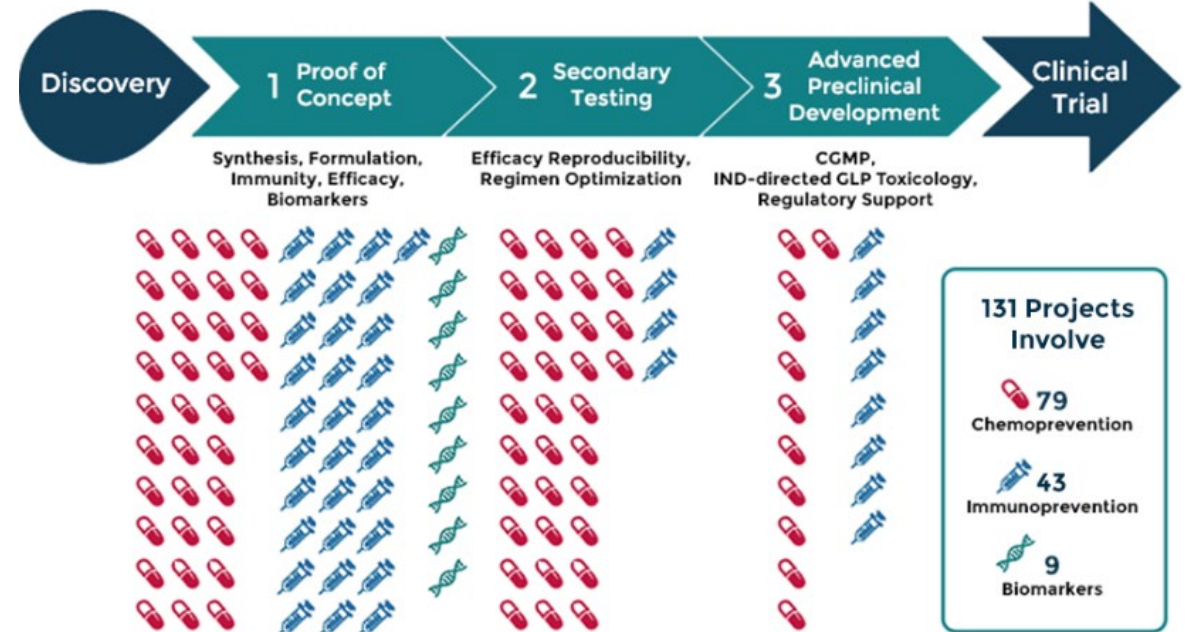
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PREVENT Cancer Preclinical Drug Development Program (PREVENT) supports the best ideas in cancer prevention using NCI contract resources

The 131 projects in PREVENT involve

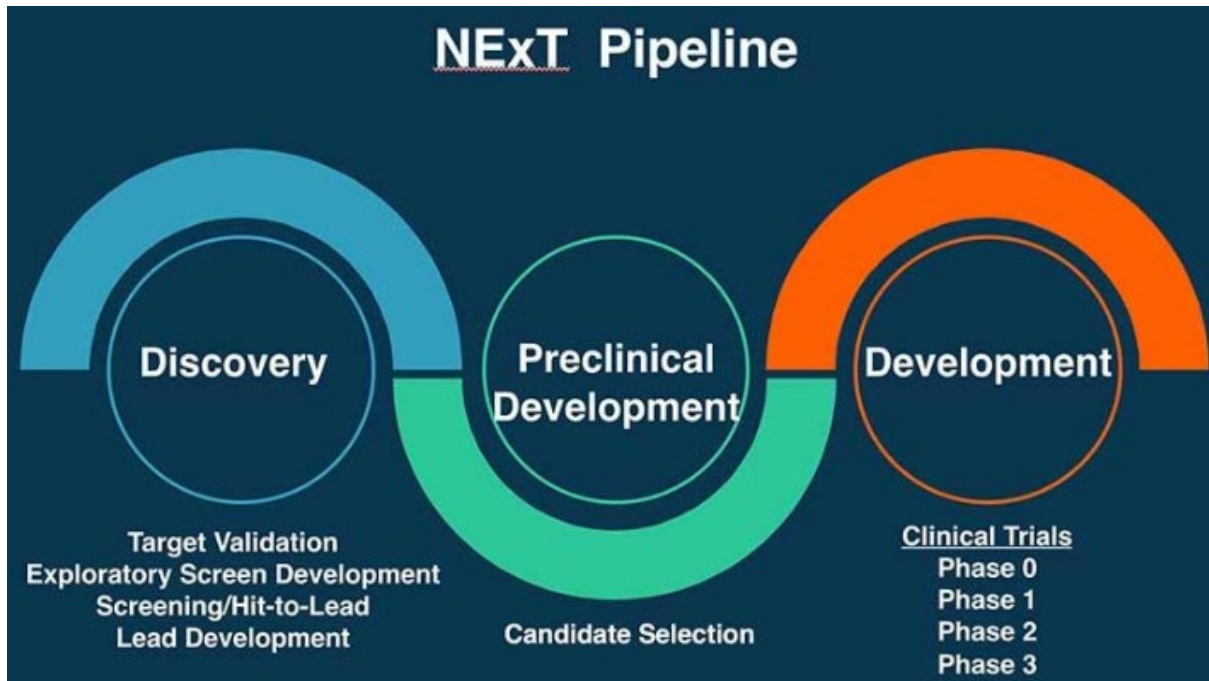


Preclinical Drug Development Pipeline



<https://prevention.cancer.gov/major-programs/prevent-cancer-preclinical-drug-development-program-prevent>

NCI Experimental Therapeutics (NExT)



Provides resources for projects focused on developing therapies for unmet medical needs in the area of oncology that are not typically addressed by the private sector.

NExT is not a grant mechanism. The NCI will partner with successful applicants to facilitate milestone-driven progression of new **anticancer drugs and imaging agents** towards clinical evaluation and registration.
Three application dates per year.

<https://next.cancer.gov>

Annotated Biospecimens



National Clinical Trials Network Navigator (NCTN Navigator)

- For cancer researchers interested in conducting studies using **specimens and clinical data collected from cancer treatment trials**
- Specimens are donated by patients in NCI-sponsored, completed Phase III trials and include **tumor tissue, nucleic acids, blood, bone marrow,...**

Inventory



<https://navigator.ctsu.org/navigator/login>

Navigator Process Flow



DCB and NCI Resources for Researchers

Experimental Resources



<https://www.cancer.gov/research/resources>

<https://www.cancer.gov/about-nci/organization/dcb/researcher-resources>

Repositories for data sharing

▶ NIH DMS policy

<https://sharing.nih.gov/data-management-and-sharing-policy>

➤ NIH-supported Scientific Data Repositories (138 listed currently)

NCI	Proteomic Data Commons (PDC)	NCI	Imaging Data Commons (IDC)
NCI	The Network Data Exchange (NDEx)	NCI	Genomic Data Commons (GDC)

<https://sharing.nih.gov/data-management-and-sharing-policy/sharing-scientific-data/repositories-for-sharing-scientific-data>

➤ Generalist repositories

- [Dataverse](#)
- [Dryad](#)
- [Figshare](#)
- [IEEE Dataport](#)
- [Mendeley Data](#)
- [Open Science Framework](#)
- [Synapse](#)
- [Vivli](#)
- [Zenodo](#)

<https://sharing.nih.gov/data-management-and-sharing-policy/sharing-scientific-data/generalist-repositories>