

# NCI Resources for Researchers

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NCI

# NCI Resources for Researchers

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Data Resources

Animal Models / Cell Lines / Reagents

Clinical Resources

# NCI-Supported Data Resources

# The Surveillance, Epidemiology, and End Results Program (SEER)

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- Provides information on cancer statistics
- Cancer data from registries covering 35% 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
- Releases new research data every spring based on the previous November's submission of data

# Molecular Cancer Data Repositories



<https://proteomics.cancer.gov/data-portal>



TCGA data describes

...including



33

DIFFERENT  
TUMOR TYPES

10

RARE  
CANCERS

...based on paired tumor and normal tissue sets  
collected from



11,000

PATIENTS

...using

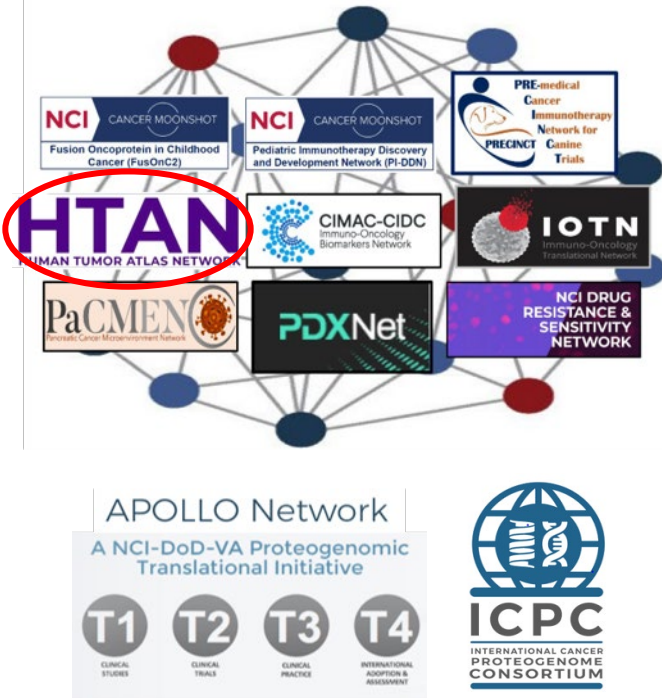
7

DIFFERENT  
DATA TYPES



<https://portal.gdc.cancer.gov>

# Many new NCI programs deliver multimodal data



## Human Tumor Atlas Network (HTAN) Data Types

molecular	ultrastructural	cellular	histological	anatomical	clinical
molecular	spatio - molecular		histological	anatomical	
● sc/snRNA-Seq	● EM	● H&E	MRI		
● sc/snEpigenomics	● Sequencing-based		CT		
● CITE-Seq	● Fluorescence-based		PET		
● RNA-Seq	● Antibody-based				
● Epigenomics					
● WES					
● Metabolomics					
● Proteomics					
● Microbiome					

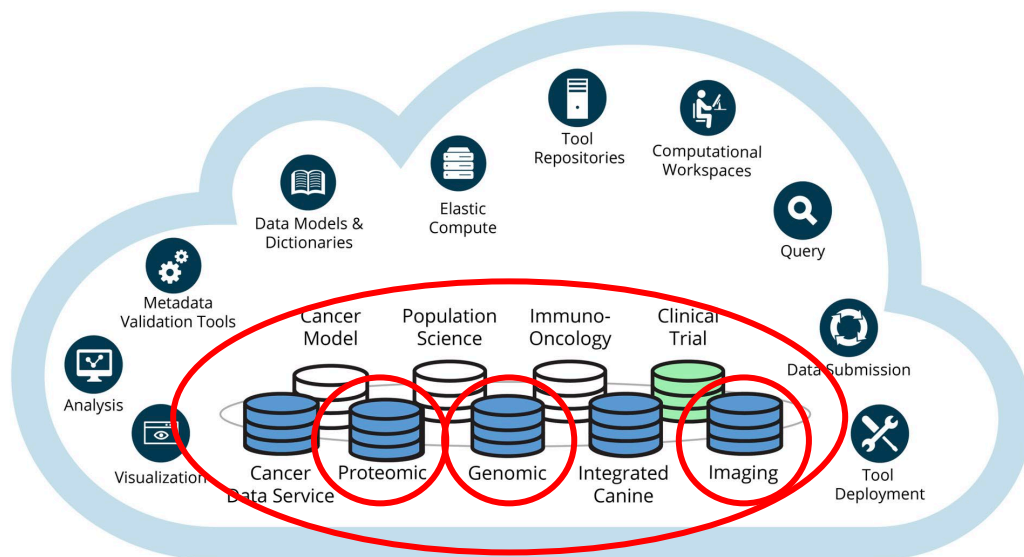
- Single Cell
- Bulk
- Multiplex Transcriptomics
- Multiplex Proteomics

Image credit: Anna Hupalowska DFCI HTAN Team

→ Need for dedicated, comprehensive Data Commons

# NCI Cancer Research Data Commons

<https://datacommons.cancer.gov>

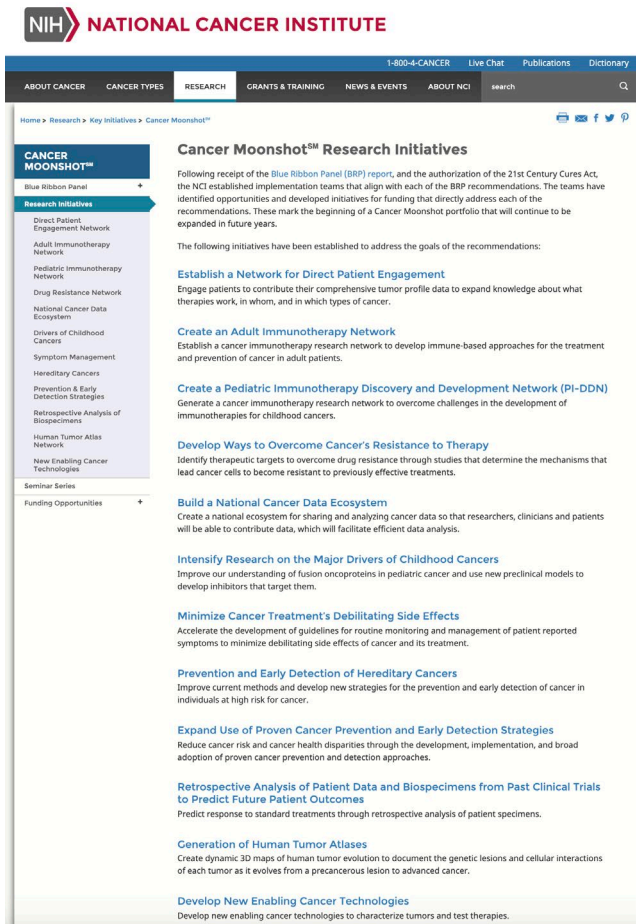


**Data Contributors & Consumers**



- Data are stored in domain- or program-specific repositories, called **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 (hosted by The Broad Institute, Institute for Systems Biology, and Seven Bridges)
- Researchers can combine their own data and tools with CRDC data for integrative analysis

# Dedicated Cancer Moonshot Data Portals



**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

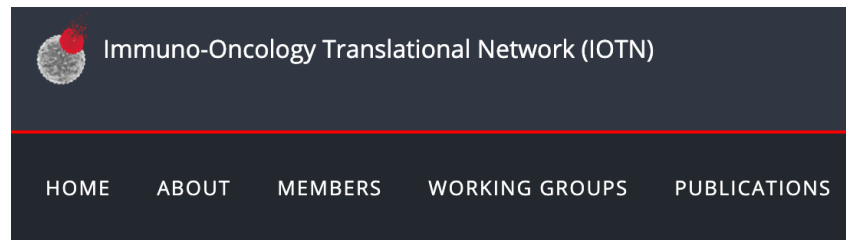
Funding Opportunities

### 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:

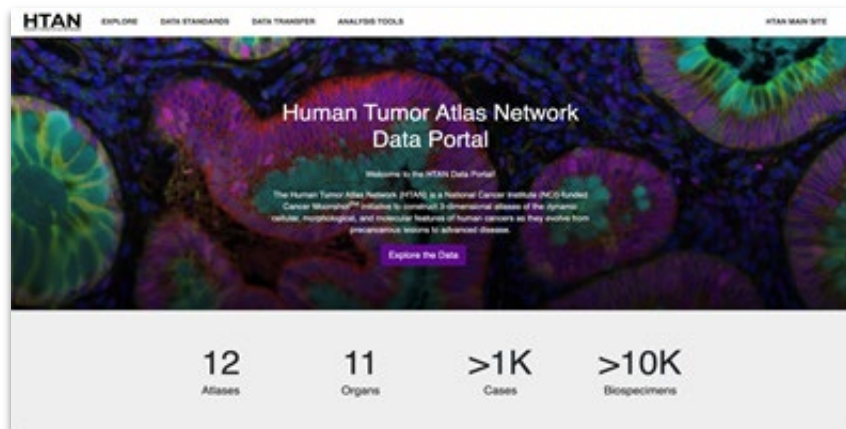
- Establish a Network for Direct Patient Engagement**  
Engage patients to contribute their comprehensive tumor profile data to expand knowledge about what therapies work, in whom, and in which types of cancer.
- Create an Adult Immunotherapy Network**  
Establish a cancer immunotherapy research network 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.



**Immuno-Oncology Translational Network (IOTN)**

HOME ABOUT MEMBERS WORKING GROUPS PUBLICATIONS

## IOTN Data Sharing Catalog



**HTAN** EXPLORE DATA STANDARDS DATA TRANSFER ANALYSIS TOOLS HTAN MAIN SITE

### Human Tumor Atlas Network Data Portal

Welcome to the HTAN Data Portal

The Human Tumor Atlas Network (HTAN) is a National Cancer Institute (NCI)-funded Cancer Moonshot™ initiative to construct 3-dimensional atlases of the dynamic cellular, morphological, and molecular features of human cancers as they evolve from precancerous lesions to advanced diseases.

[Explore the Data](#)

12 Atlases 11 Organs >1K Cases >10K Biospecimens

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



# Data Portals for Other NCI Initiatives

## Cancer Target Discovery and Development

### CTD<sup>2</sup> Data Portal



#### **The Broad Institute**

Columbia University	4 Datasets
Dana-Farber Cancer Institute	7 Datasets
Emory University	13 Datasets
Fred Hutchinson Cancer Research Center – 1	6 Datasets
Fred Hutchinson Cancer Research Center – 2	6 Datasets
Johns Hopkins University	3 Datasets
Oregon Health and Science University – 1	2 Datasets
Oregon Health and Science University – 2	1 Datasets
Stanford University	0 Datasets
Translational Genomics Research Institute (complete)	5 Datasets
University of California San Diego	3 Datasets
University of California San Francisco – 1	0 Datasets
University of California San Francisco – 2	3 Datasets
University of Texas MD Anderson Cancer Center (complete)	4 Datasets
University of Texas Southwestern Medical Center (complete)	4 Datasets
	8 Datasets

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

## Cancer Systems Biology Consortium (CSBC)

<https://csbconsortium.org>

## Physical Sciences-Oncology Network (PS-ON)

<https://physics.cancer.gov>



Cancer Complexity Knowledge Portal

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

# NCI-supported Data Analysis Tools

- Informatics Technology for Cancer Research (<https://itcr.cancer.gov>)

The screenshot shows the top of the ITCR website. On the left is the NIH logo and the text "NATIONAL CANCER INSTITUTE Informatics Technology for Cancer Research". On the right are links for "Home | Contact Us | Download ITCR Fact Sheet" and a search bar with the text "Search..." and a "SEARCH" button. Below this is a dark blue banner with the text "Supporting Informatics Needs Across the Cancer Research Continuum". Underneath is a section titled "INTRODUCTORY VIDEOS" in red. A paragraph states: "ITCR supports a wide range of informatics tools to serve current and emerging needs across the cancer research continuum. Short introductory videos for many of the ITCR Tools are available below." Below this paragraph are five video thumbnails, each with a play button icon and a tool name: "Bioconductor", "Single Cell Genome Viewer (SCGV)", "Cistrome", "Cancer-Related Analysis of Variants Toolkit (CRAVAT)", and "cTAKES".

NIH NATIONAL CANCER INSTITUTE Informatics Technology for Cancer Research

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Search... SEARCH

Supporting Informatics Needs Across the Cancer Research Continuum

## INTRODUCTORY VIDEOS

ITCR supports a wide range of informatics tools to serve current and emerging needs across the cancer research continuum. Short introductory videos for many of the ITCR Tools are available below.

Bioconductor

Single Cell Genome Viewer (SCGV)

Cistrome

Cancer-Related Analysis of Variants Toolkit (CRAVAT)

cTAKES

- Others (<https://www.cancer.gov/research/resources>)

# **NCI-Supported Animal Models, Cell Lines and Reagents**



<https://frederick.cancer.gov/science/technology/mouserepository>

## Mouse cancer models

- 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

- ES cells overexpressing microRNAs
- MicroRNAs are GFP labeled
- MicroRNA expression is inducible

# Developmental Therapeutics Program

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

- 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
- Repository of Patient-Derived Models

# **NCI-Supported Clinical Resources**

# NCI Patient-Derived Models Repository (PDMR)

<https://pdmr.cancer.gov>

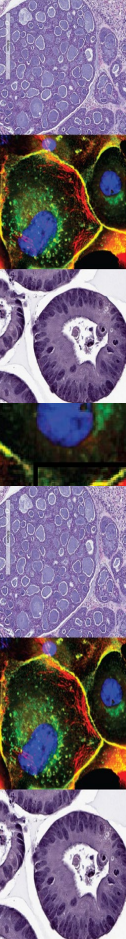
Generated from primary and metastatic tumor tissues and blood specimens supplied by NCI-supported clinical trials, research programs and Cancer Centers

- Patient-derived xenografts
- Patient-derived tumor cell cultures
- Cancer associated fibroblasts
- Patient-derived organoids

Will include a limited amount of patient data:

- Previous clinical therapies
- Smoking history
- Race/ethnicity
- Representative **sequencing for a sub-set of PDXs** (targeted gene panel, WES, RNASeq)
- Will also accept previously derived PDX models developed at external sites

For information regarding access to PDMR resources, contact Yvonne Evrard ([evrardy@mail.nih.gov](mailto:evrardy@mail.nih.gov))



# Annotated Biospecimens



## National Clinical Trials Network Navigator (NCTN Navigator)

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

- For cancer researchers interested in conducting studies using **specimens and clinical data collected from cancer treatment trials** (239 trials, 150 K patients, 2 M Specimen)
- Specimens are donated by patients in NCI-sponsored, completed Phase III trials and include **tumor tissue, nucleic acids, blood, bone marrow,...**

### Navigator Process Flow







# Additional NCI Resources....

- Ras Initiative (<https://www.cancer.gov/research/key-initiatives/ras/outreach/reference-reagents>)
- Cooperative Human Tissue Network (<https://www.chtn.org/>)
- PDX Development and Trial Centers Research Network (PDXNet) (<https://www.pdxnetwork.org>)
- Biopharmaceutical Development Program (BDP) at Frederick National Lab (<https://frederick.cancer.gov/Science/Bdp>)



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[www.cancer.gov/espanol](http://www.cancer.gov/espanol)