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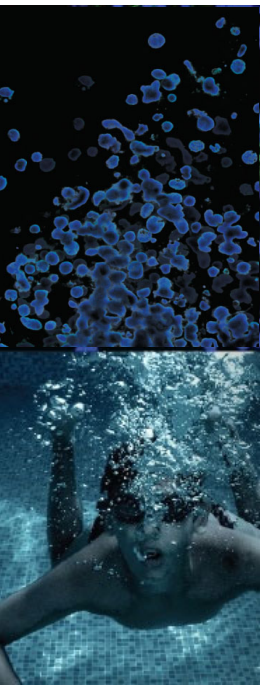

Organoid Culture Fundamentals: Critical Steps for Success

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Product Line Business Specialist

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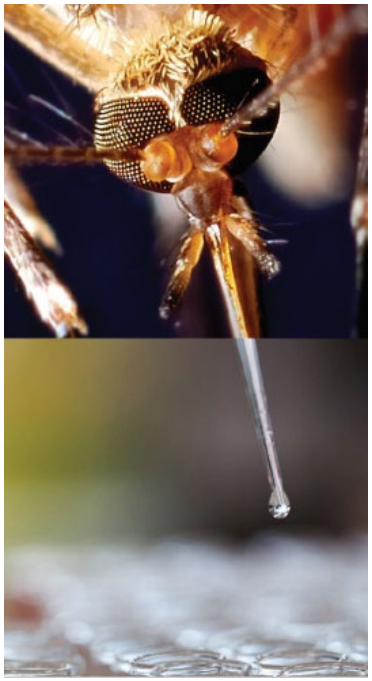
Senior Scientist, ATCC Cell Systems

Credible Leads to Incredible™



About ATCC

- Founded in 1925, ATCC is a non-profit organization with HQ in Manassas, VA, and an R&D and Services center in Gaithersburg, MD
- World's largest, most diverse biological materials and information resource for cell culture – the "*gold standard*"
- Innovative R&D company featuring gene editing, differentiated stem cells, advanced models
- cGMP biorepository
- Partner with government, industry, and academia
- Leading global supplier of authenticated cell lines, viral and microbial standards
- Sales and distribution in 150 countries, 19 international distributors
- Talented team of 450+ employees, over one-third with advanced degrees

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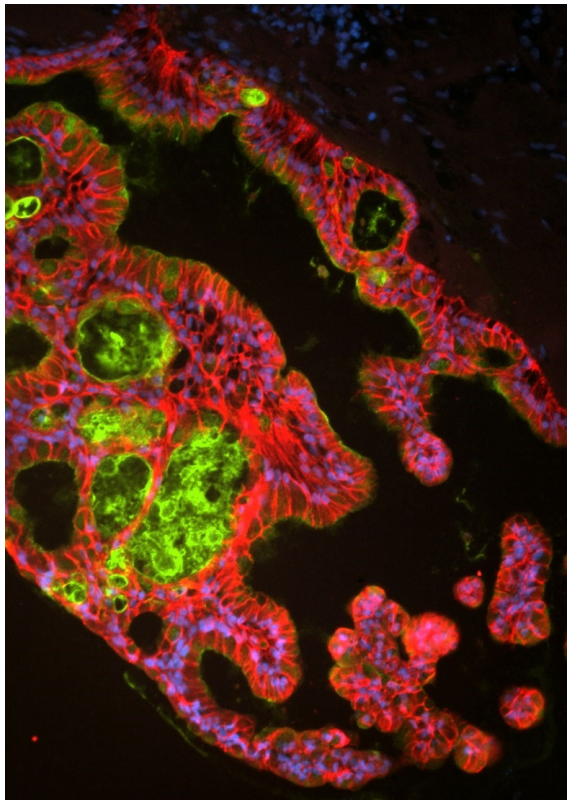
Agenda

- HCMI Background
- Model Descriptions
- HCMI Support / GDC and HCMI Catalog
- ATCC Cell Culture Support
- Organoid Culture Educational Video



Why are new models needed?

- Poor representation of some cancer types/subtypes
- Lack of patient and clinical outcome data, model history
- Lack of comparison to normal reference sample and/or directly compared to primary tumor
- Insufficient to capture the genetic diversity of cancer
- Existing lines may not be biologically/genetically representative of in vivo tumor

There is a need for better preclinical models to predict therapeutic outcomes

Overview of HCMI and ATCC

Founders

- National Cancer Institute
- Cancer Research UK
- Hubrect Organoid Technology Foundation
- Wellcome Sanger Institute

Model Development

- Broad Institute
- Cold Spring Harbor Laboratory
- Wellcome Sanger Institute
- Hubert Organoid Technology Foundation
- University of Verona
- Hubrecht Institute
- Stanford University
- Weill Cornell Medical College

Distribution

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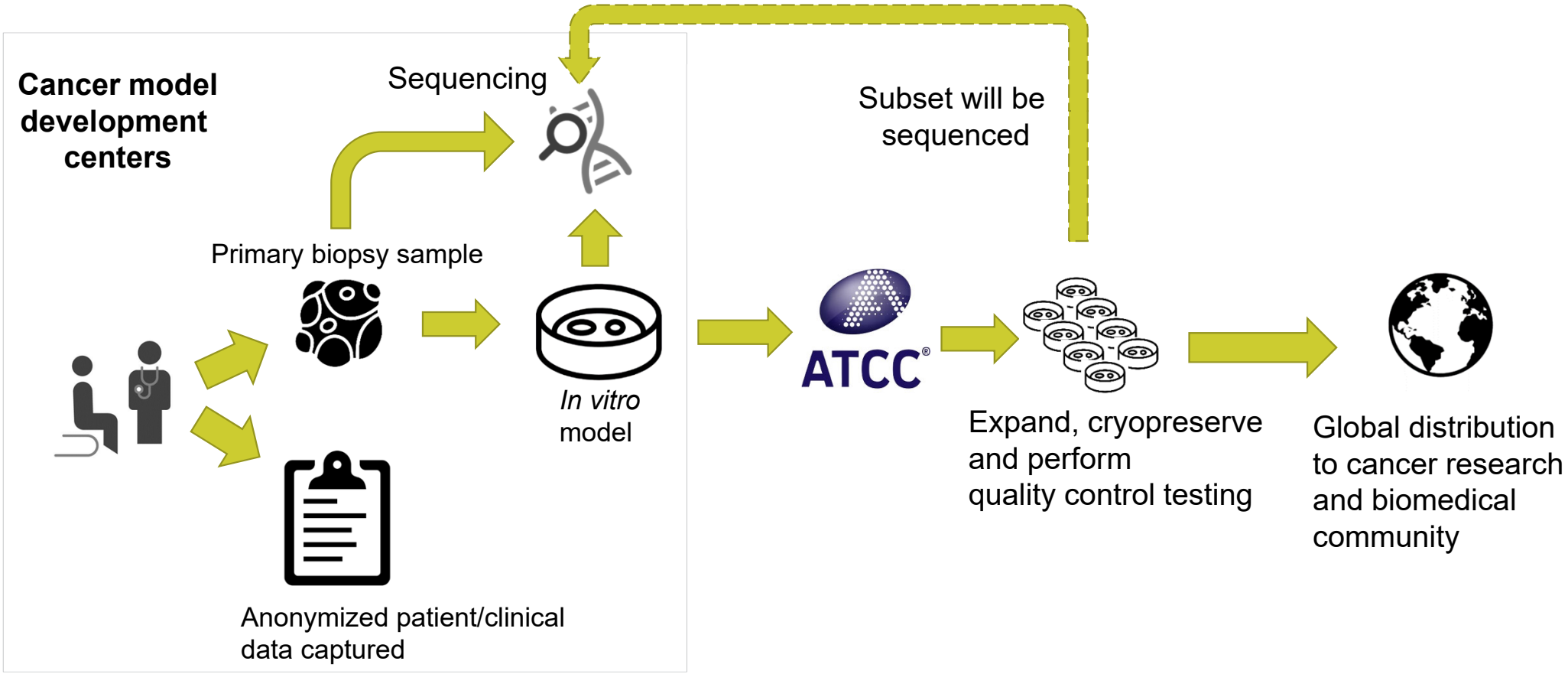
Generation and distribution of HCMI models



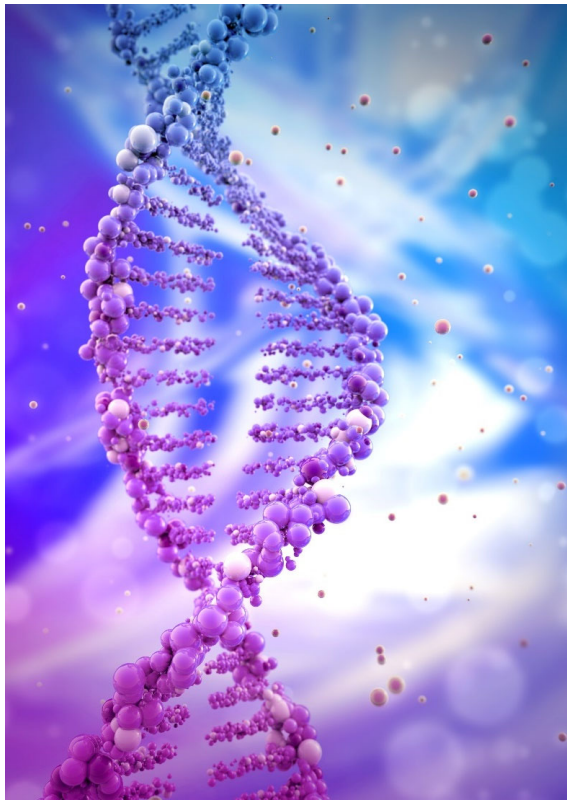
Characterization of models

Molecular

- 15X Whole Genomic Sequencing (WGS) of model, primary tumor, and normal tissue
- 150X Whole Exosome Sequencing (WXS) of model, primary tumor, and normal tissue
- RNA-seq of model and primary tumor

Clinical

- Disease diagnosis
- Patient demographics
- Treatment and outcomes



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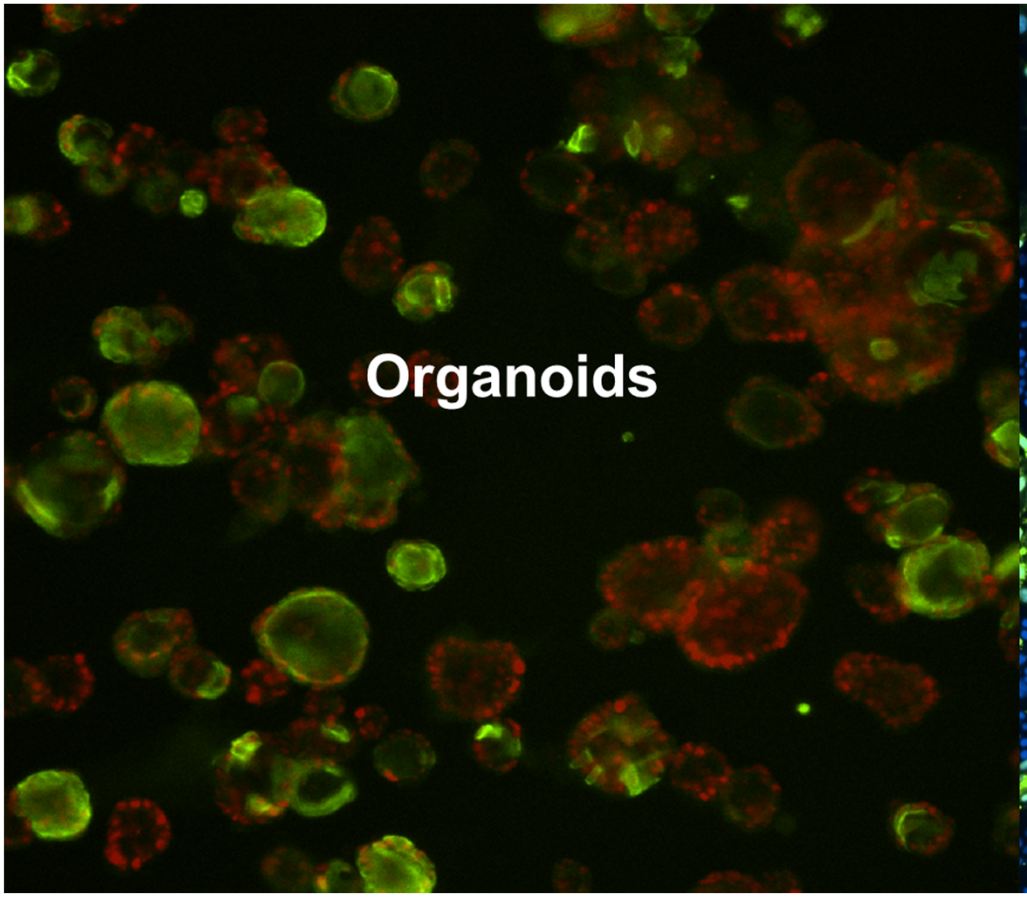
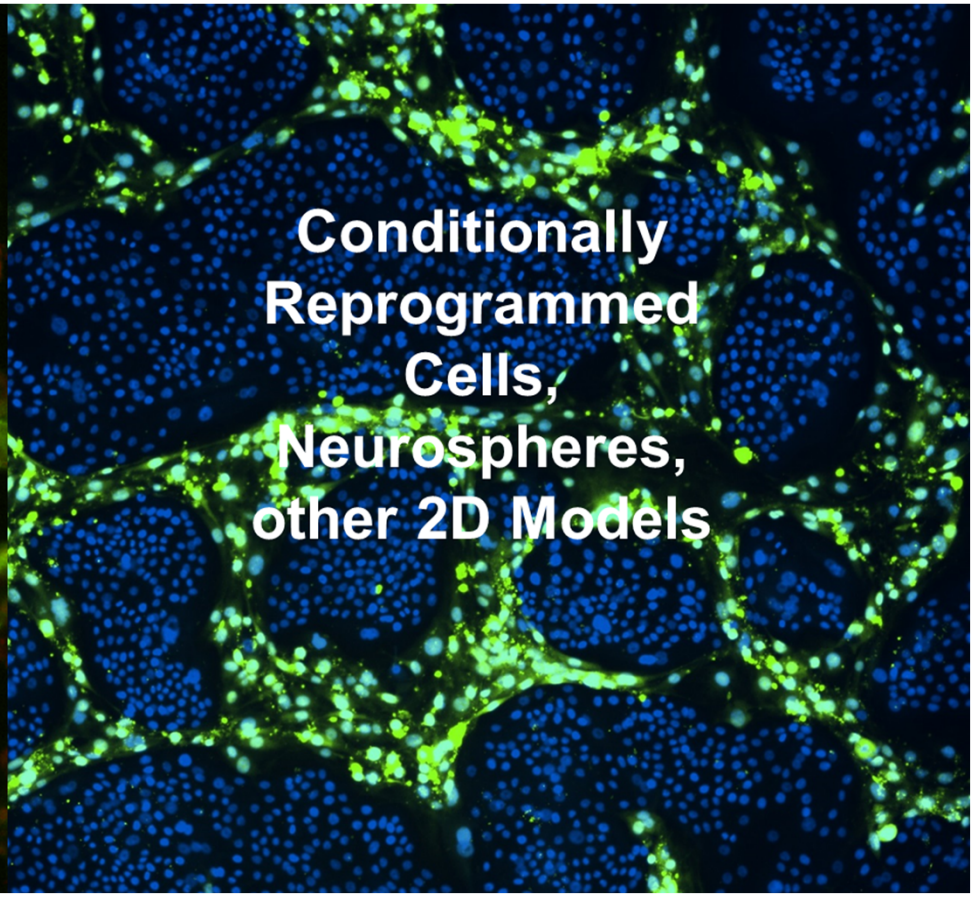
Advanced culture technologies





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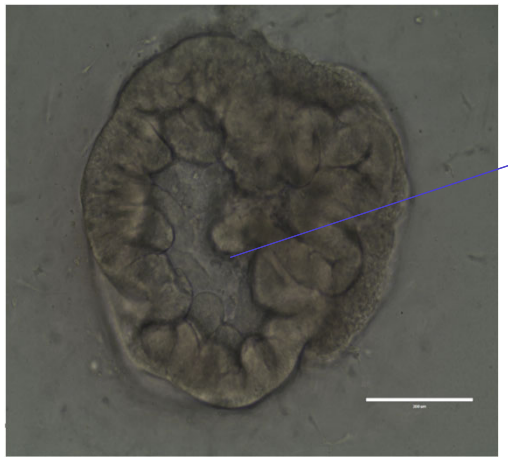
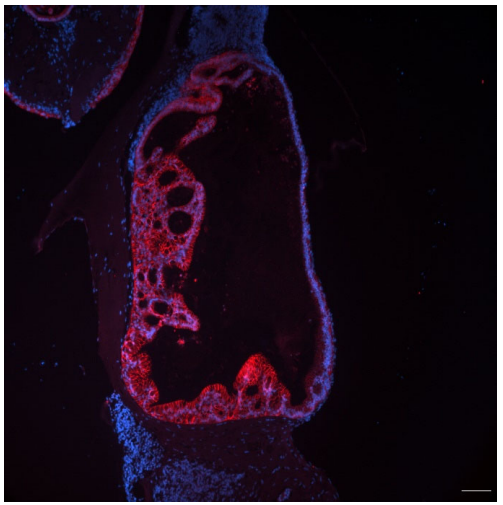
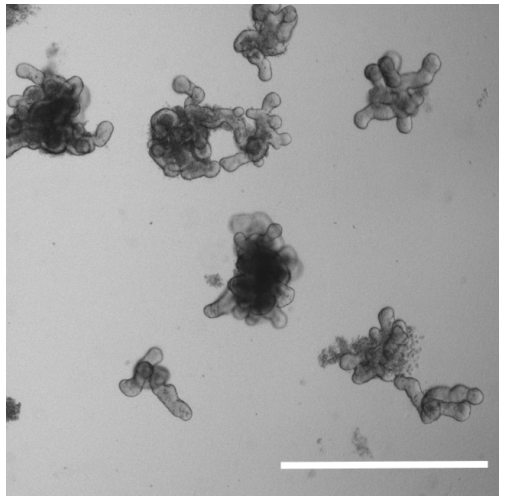
What is an HCMI Organoid?

Organoids are complex, self organizing microtissues embedded within a 3D extracellular matrix

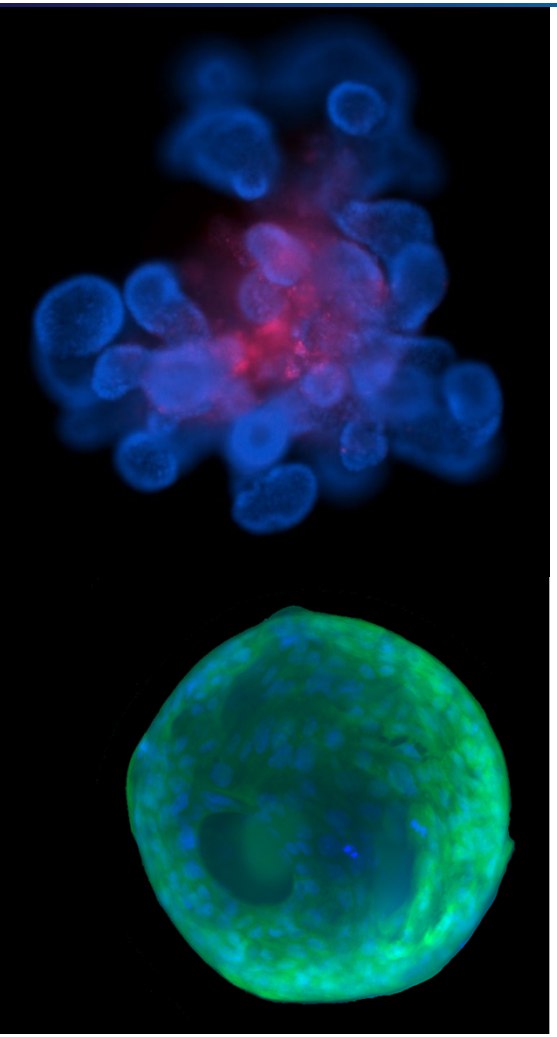
- Patient derived
- Multiple cell types
- Cellular polarization
- In vivo like architectural features (lumen)
- Long term expansion
- Phenotypically and genetically stable



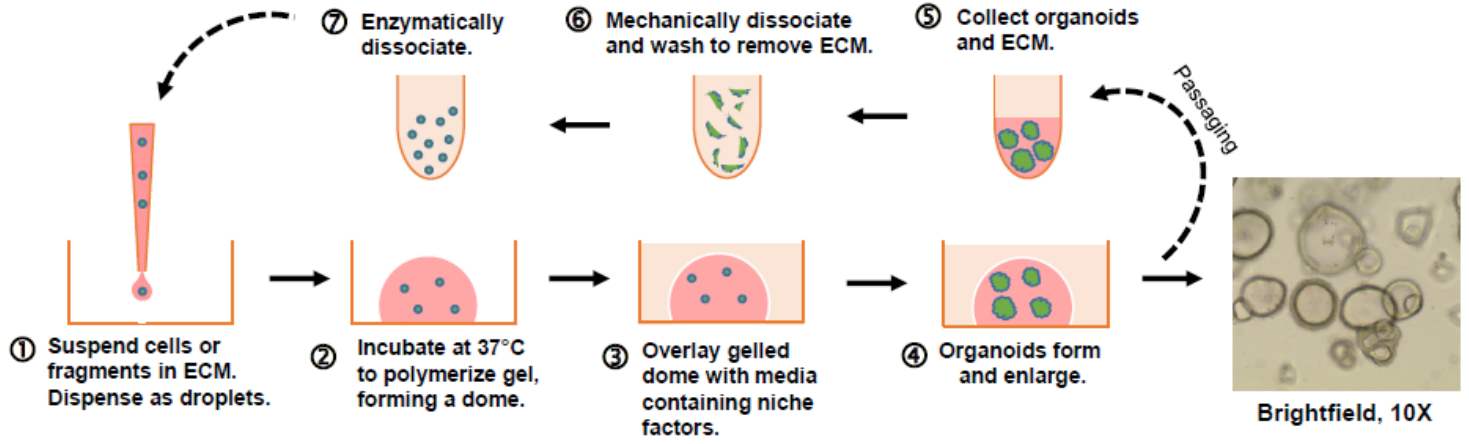




Organoid technology



Embedded three-dimensional culture technique that utilizes model-specific growth media formulations in combination with undefined extracellular matrix



https://currentprotocols.onlinelibrary.wiley.com/doi/epdf/10.1002/cpcb.66

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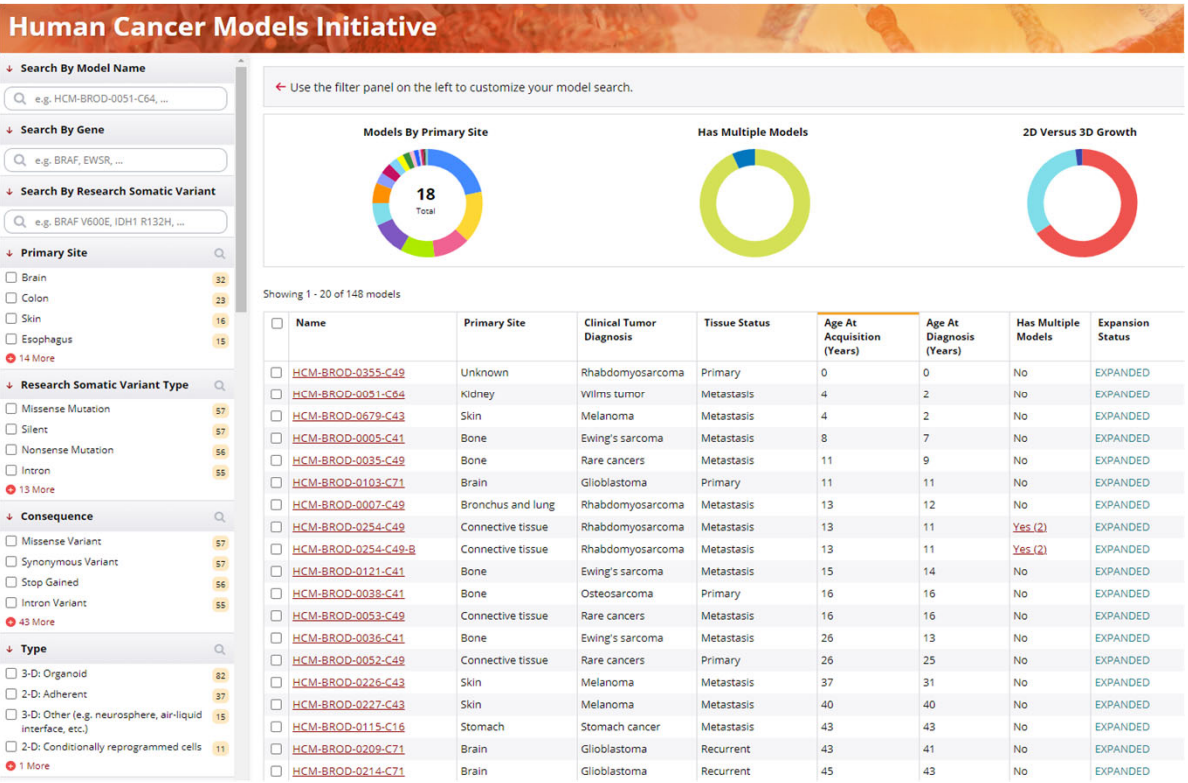
Model resources and data access



- NCI managed website
- Integrates clinical, model, and genomic information
- Search for models of interest using various filters
  - Primary tumor site/acquisition site
  - Model type
  - Tumor diagnosis/stage/grade/ histological type
  - Gender/age/ethnicity
- Links out to clinical and genomic data, ATCC model product page

hcmi-searchable-catalog.nci.nih.gov

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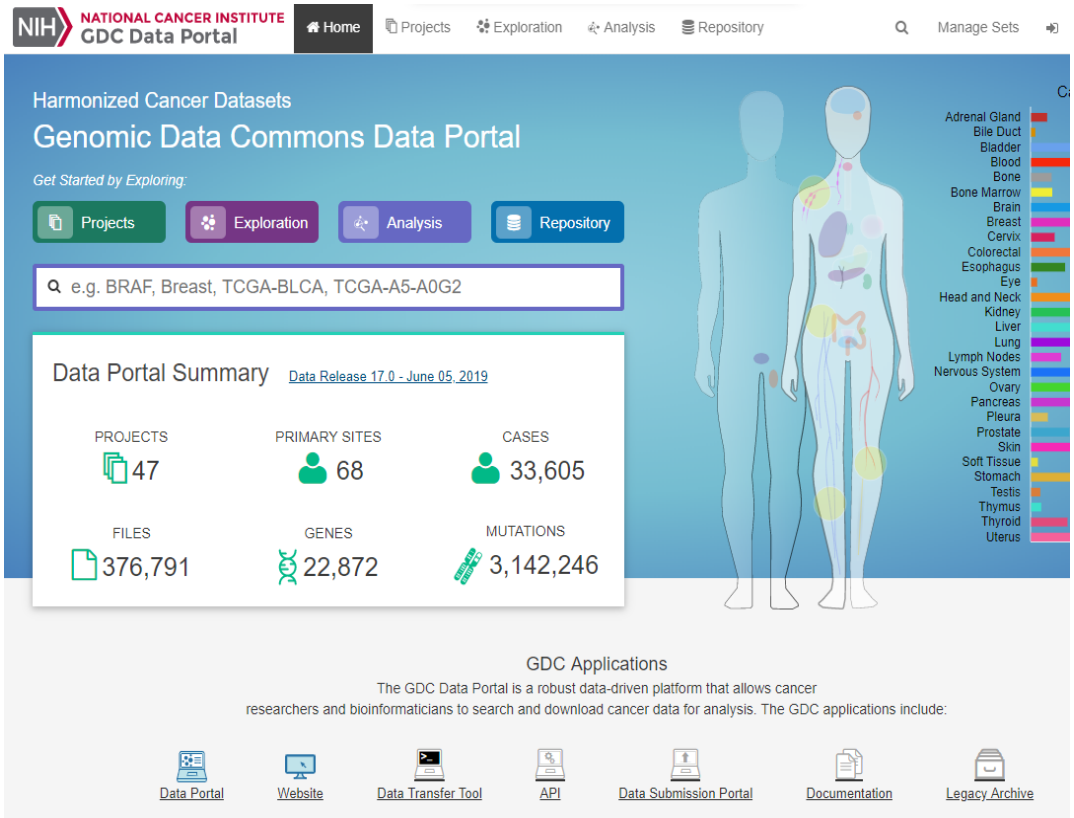
Model resources and data access



- NCI managed website
- Search and download cancer related datasets for analysis
- Navigate to the “HCMI-CMDC” project for HCMI specific datasets
- Download WGS/WXS/RNAseq data
  - Aligned reads, gene expression, SNVs

portal.gdc.cancer.gov

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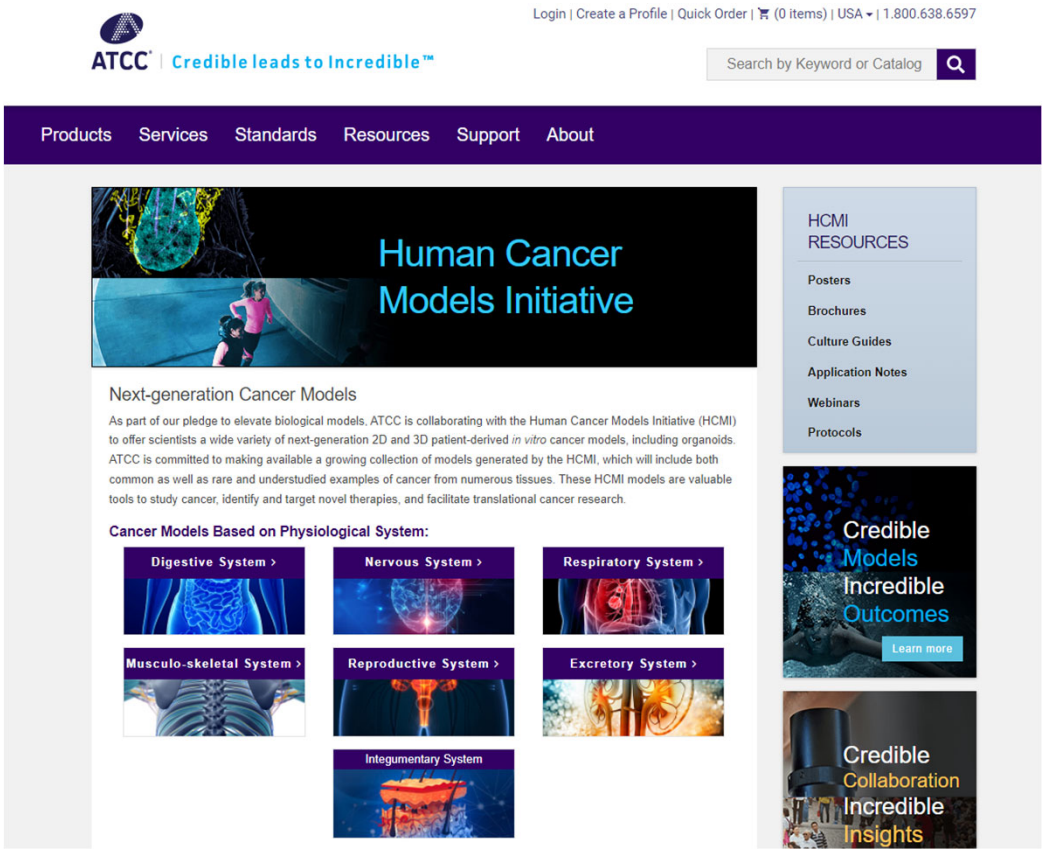
Model resources and data access



www.atcc.org/HCMI

- View all models available or grouped by tissue
- Model specific information such as:
  - Culture images
  - Seeding densities
  - Media change frequencies
- Individual model product pages include detailed culture protocols
  - Complete media formulation
  - Thawing/subculturing/freezing guides
- Model pages link to other resource pages that host clinical and sequencing data
- Frequently asked questions

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Detailed Support for Organoid Culture

Protocols
- Subculturing
- Thawing
- Freezing

Formulations
- Complete list of components
- Medium – Reagents

CoreKits
- Reagents specific to models
- Recombinant proteins / chemicals

Coming Soon!

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Where we are now

Over the past two years, ATCC has worked with NCI and the model developers to launch 150 next generation models including **80 organoid models**

Types

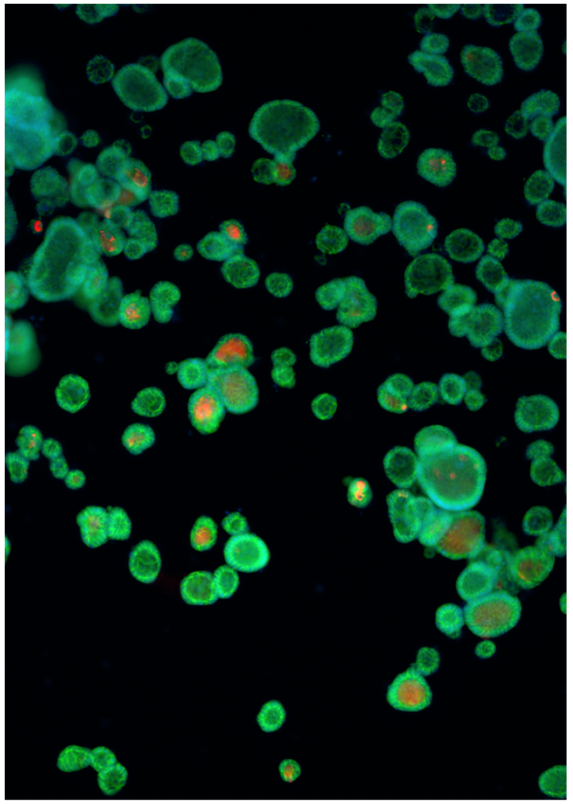
- Adenocarcinoma
- Carcinoma

Stages

- Primary
- Recurrent
- Metastatic
- Pre-malignant

Tissues

- Lung
- Colon
- Rectum
- Mammary
- Esophagus
- Pancreas
- Liver
- Stomach



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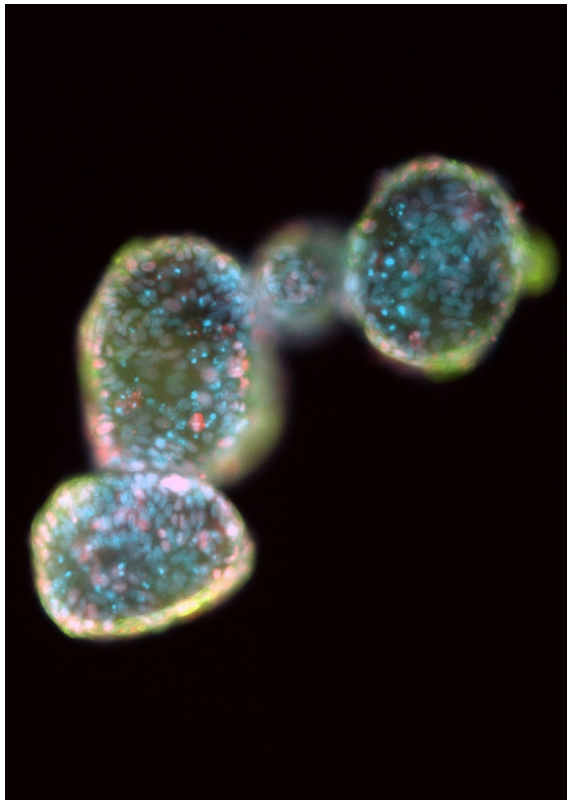
Summary

- Information on models is available:
  - HCMI searchable catalog
  - GDC Data Portal
  - ATCC offers organoid culture protocols, formulations, and materials needed
  - Coming soon: Core growth kits to with pre-aliquoted supplements to make organoid culture easy
- ATCC currently offers 150 models with approximately 40 more models being launched in upcoming months
- For more information, download the Organoid Culture guide or re-watch the organoid cell culture video available on the ATCC website



www.atcc.org/organoids

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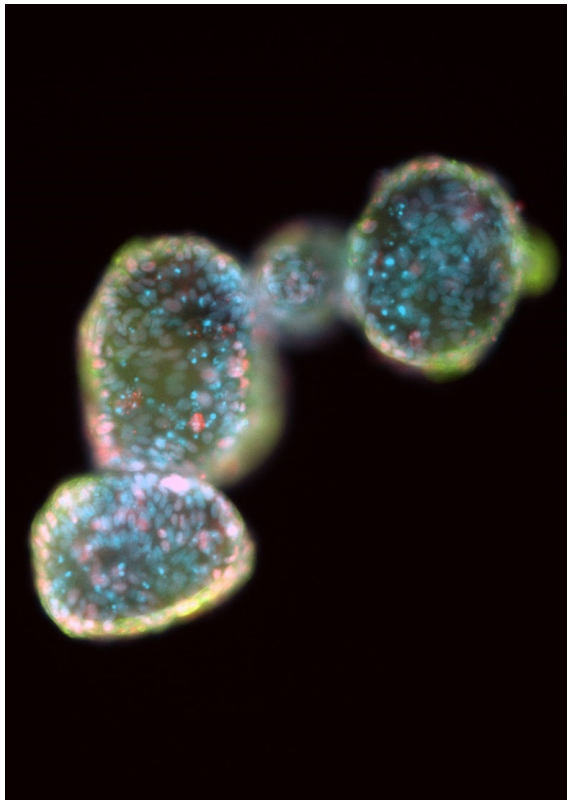
Upcoming events

- Webinars:
  - The Importance of Using Next-Generation Sequencing to Further Authenticate the ATCC Microbial Collections
  - Presented by: Briana Benton
  - April 8
  - ATCC offers organoid culture protocols, formulations, and materials needed
  - Coming soon: Core growth kits to with pre-aliquoted supplements to make organoid culture easy
- Tradeshow: AACR2021

www.atcc.org/organoids



AACR 2021

AACR Annual Meeting 2021

American Association for Cancer Research

4/10/2021 – 4/15/2021

Primary NK Cells and Luciferase Expressing Reporter Cell Lines for Use in Developing ADCC Assays for Immuno-oncology Drug Screening

Presenter: Haiyun Liu, PhD, *Scientist*, ATCC

Poster Number: 1306

Checkpoint Molecule Profiling in Tumor Cell Lines and Immune Cell Lines for Applications in Immuno-oncology Drug Screening

Presenter: Brian Della Fera, *Biologist*, ATCC

Poster Number: 1648

www.atcc.org/AACR2021