

NCI Patient-Derived Models Repository (PDMR) Database User Help Guide

Effective Date: 6/3/2021

Please check for revision status of the SOP at

<https://pdmr.cancer.gov/sops/>

PDMR NCI Patient-Derived Models Repository
An NCI Precision Oncology InitiativeSM Resource

New samples are always being added to the Repository, even for existing patient IDs, so check the database often. For example, a PDC culture may develop after the PDX has been made public or a secondary tissue collection site might develop a PDX after one from a primary site has been developed.

Visit the PDMR database: <https://pdmdb.cancer.gov/web/apex/f?p=101:1>

Visit the PDMR website for more info: <https://pdmr.cancer.gov/>

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1.0 WHAT INFORMATION CAN I FIND IN THE PDMR DATABASE?

Patient → Patient Specimen(s) → Sample(s) → Distribution Lot



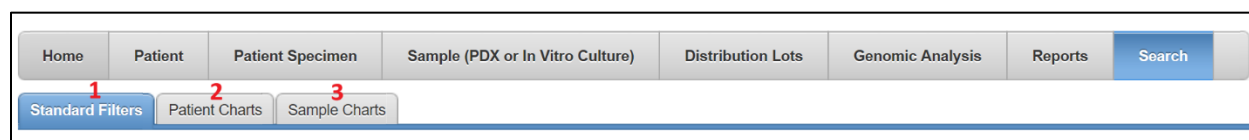
- 1.1 The PDMR database is structured in a nested fashion and includes information such as:
- 1.2 **Patient:** Patient ID, diagnosis, Grade/Stage and STR profiles of all distribution lots for the patient. The limited medical information tab (non PII) will include treatment history medical history (e.g., genetic screening, prior disease history), self-reported race/ethnicity, and inferred ancestry from sequencing data.
- 1.3 **Specimen(s)** - collected specimen tissue from the patient: specimen id, site of tumor collection, origin (primary vs metastatic), collection date, human pathogen status. Specimen notes. PDX Growth Curves of consecutive passages. Consensus WES of Genomic Variants. PDX mouse strain and implant site.
 - Note: Not all specimens give rise to multiple types of distributable samples.
- 1.4 **Sample(s)** – representative information for generated models: type (PDX, PDC, PDOrg, CAF, originator), Pathology Data including H&E images and tumor/stromal content, individual NGS files (WES, RNASeq), Cancer Gene Panel mutational status.
- 1.5 **Distribution Lots:** type of material available (PDX, PDC, PDOrg, CAF), maximum passage of distributed material, Distribution Lot Name (for requests), and human pathogen status

2.0 HOW ARE THE MODELS CLASSIFIED?

- 2.1 Models are classified **first by Disease Body Location**
 - 2.1.1 Link to NCI definitions: <https://www.cancer.gov/types/by-body-location>
- 2.2 **Then by** CTEP Simplified Disease Classification (SDC) corresponding to the patient diagnosis
 - 2.2.1 Link to the CTEP list: https://ctep.cancer.gov/protocolDevelopment/codes_values.htm#disease
 - 2.2.2 This is a modified list of MedDRA disease codes for cancer provided by NCI's Cancer Therapy Evaluation Program (CTEP).

3.0 HOW TO SEARCH

3.1 Option 1: SEARCH Tab



3.1.1 Standard Filters – apply filters across multiple categories

3.1.2 Patient Charts – Search with interactive pie chart by the following categories:
(See SOP Section 4.1 - Example 1)

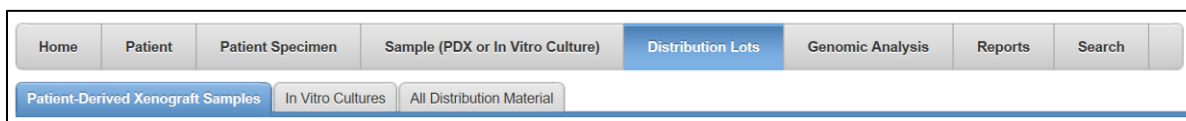
- Disease Body Location
- Tissue Type – e.g., biopsy, resection
- Therapy Regimen
- Gene – Known gene involved in cancer, can apply “AND Logic” or “OR Logic” to filter

3.1.3 Sample Charts – Search with interactive pie chart by sample types

- PDX
- PDC
- CAF
- PDOrg – organoids

3.1.4 This mode/method of searching will retrieve all specimen records with associated search term and/or filters. You must still open the individual specimen pages to access available distribution models.

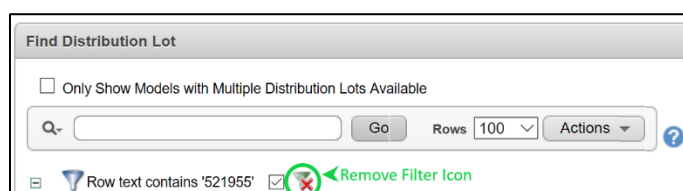
3.2 Option 2: DISTRIBUTION LOTS Tab



3.2.1 Search by Keyword/term in Distribution Lot sub-tabs.

- **Patient-Derived Xenograft Samples** only sub-tab
- **In Vitro Cultures** only sub-tab
- **All Distributed Material** sub-tab. Can check the 'Only Show Models with Multiple Distribution Lots Available' to display, for instance, models that have both a PDX and a PDC model.

3.2.2 Type in the search term and click Go. To remove filter, click on the "Remove Filter Icon."

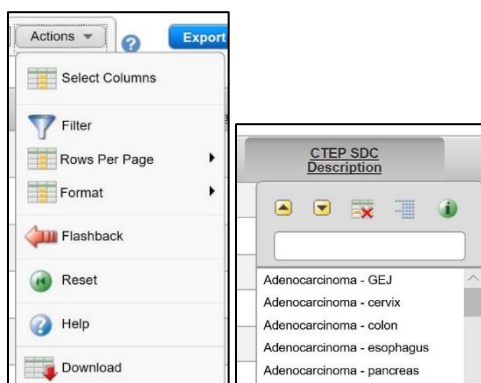


3.3 Advanced Users

3.3.1 Users can modify search outputs (customize report) by using the **Actions** pull-down menu.

- **Select Column:** used to modify (add, remove, reorder) data columns displayed.
- **Filter:** advanced filter (see online help)
- **Format:**
- **Chart:** displays the report data as a chart

3.3.2 Users can also easily search within, sort, or hide a column by clicking on individual column headings

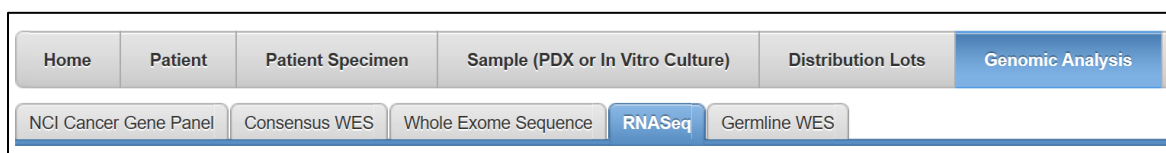


3.4 Search for Next-generation sequencing (NGS) Data

IMPORTANT: NGS files from multiple passages of PDXs are available. These datasets are representative of the models and may not exactly match the distributable PDX fragment.

3.4.1 NGS Data are available for ALL available patient and distribution material free of charge for originator/patient (where there was sufficient material), PDXs, PDOrg, PDC, and germline samples (PBMC or CAF origin; where there was sufficient material).

3.4.2 Users can easily search for NGS Data (RNASeq, WES, Gene mutations, etc) under the GENOMIC ANALYSIS tab and then choosing the sub-tab for the data type they wish to query.



- RNASeq: Gene expression for individual samples (.fastq and .tpm).
- Whole Exome Sequence (WES): Sequence files for individual samples (.fastq and .vcf)
- Consensus WES: reports variants present in 100% of the sequenced PDX samples
- Cancer Gene Panel: Detailed list of variants in genes implicated in cancer

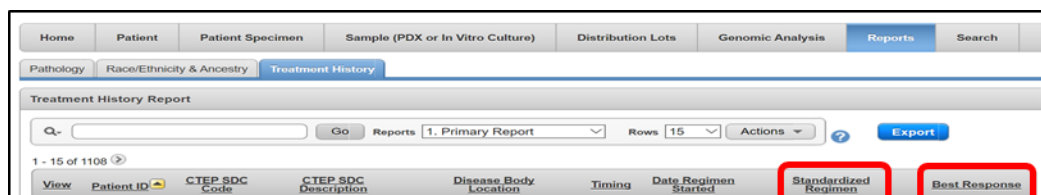
3.4.3 When using the search bar within the GENOMIC ANALYSIS sub-tab, you must first select the search criteria from the magnifying glass drop down list. Alternatively, use the column filter feature.



3.5 Search by Patient Treatment History

3.5.1 Users can easily search by treatment history under the REPORTS tab and then choosing the TREATMENT HISTORY sub-tab.

- Search for treatment – listed by generic drug name – or filter using the Standard Regimen column.
- Treatment response (if available) is reported under the BEST RESPONSE column.



4.0 STEP-BY-STEP GUIDE

4.1 EXAMPLE 1: Find Melanoma samples

4.1.1 Navigate to the **Patient Charts** sub-tab under Search tab.

4.1.2 Choose to plot data by Disease Body Location.

4.1.3 Melanoma affects the skin so we will click on the “Skin” pie area (Left image below).

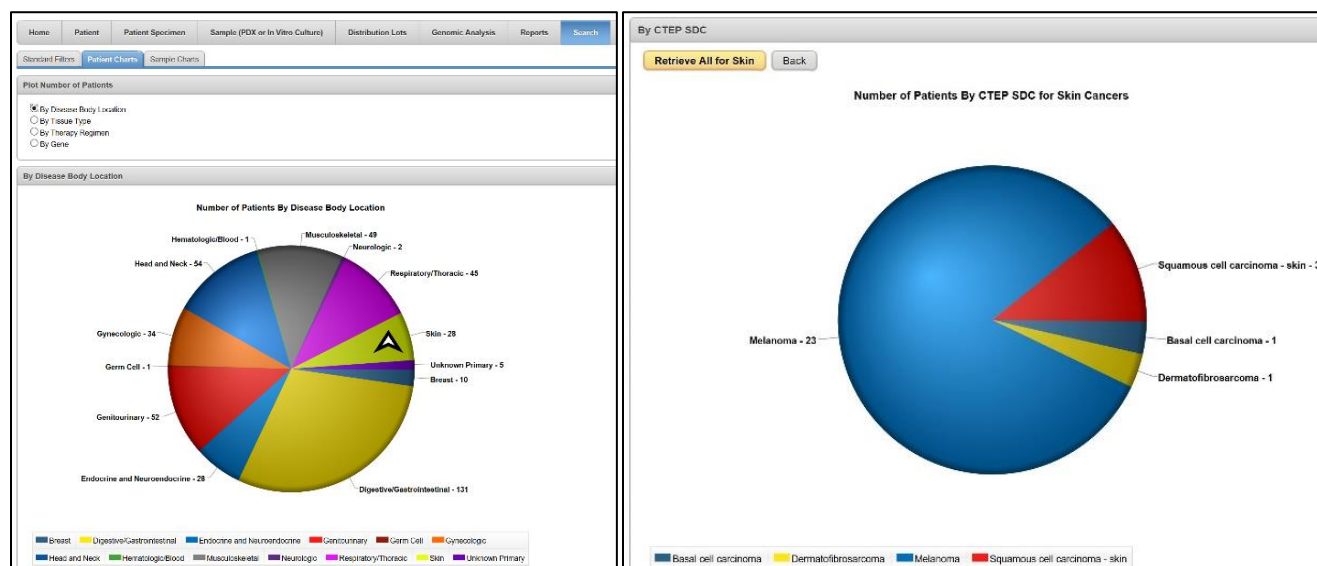
4.1.4 This brings us to a pie chart of different types of Skin cancer.

4.1.5 Click on the Melanoma pie area to retrieve records for only melanoma samples (Right image below).

4.1.6 Click the “Retrieve All for Skin” button at the top of the page to retrieve records for all skin cancer samples.

4.1.7 Click the “Back” button to return to the previous pie chart.

4.1.8 Since we are looking for melanoma samples, we will click on the Melanoma pie area



4.1.9 This brings us to a list of all available melanoma specimens. Click the Specimen ID link to take you to the Specimen record where you can find the type of Material Available for Distribution.

4.1.9.1 Apply additional filters using the Search Parameters on the Left

Search Parameters

Only display Patients and Specimens where:

- ☐ Patient has known metastatic disease
- ☐ MSI-High Models
- ☐ Metastatic Models
- ☐ At least one Sample has Image data
- ☐ At least one Sample has Whole Exome Sequence data
- ☐ At least one Sample has RNASeq data
- ☐ Patient has Germline sequence

Use CTRL or Shift key to select multiple entries within a list:

Biological Sex: Female

Disease Body Location: Digestive/Gastrointestinal

PDM Type: PDX

Applied Search Filters (1)

Search Results

Patient ID	Specimen ID	Biological Sex	CTEP SDC Description	Disease Body Location	Tissue Type	Has Metastatic Disease	Has Image Data	OncoPrint Gene Panel Data	Whole Exome Sequencing Data	RNA-Seq Data	Germline Data	Self-Reported Race
128128	328-B	Male	Melanoma	Skin	Resection	Yes	Yes	Yes	Yes	Yes	Yes	White
137389	322-B	Male	Melanoma	Skin	Resection	Not Reported	Yes	Yes	Yes	Yes	Yes	Black or African American
156881	154-B	Female	Melanoma	Skin	Resection	Yes	Yes	Yes	Yes	Yes	Yes	Not Provided
174841	126-T	Male	Melanoma	Skin	Tumor Biopsy	Not Reported	Yes	Yes	Yes	Yes	Yes	White
182817	245-B	Female	Melanoma	Skin	Resection	Not Reported	Yes	Yes	Yes	Yes	Yes	White
199967	284-B	Female	Melanoma	Skin	Resection	Yes	Yes	Yes	Yes	Yes	Yes	White
215181	154-B	Male	Melanoma	Skin	Resection	Yes	Yes	Yes	Yes	Yes	Yes	White
245324	828-B	Male	Melanoma	Skin	Resection	Yes	Yes	Yes	Yes	Yes	Yes	White
251568	266-B	Male	Melanoma	Skin	Resection	Yes	Yes	Yes	Yes	Yes	Yes	White
277867	354-B	Male	Melanoma	Skin	Resection	Yes	Yes	Yes	Yes	Yes	Yes	White
279218	305-B	Male	Melanoma	Skin	Resection	Yes	Yes	Yes	Yes	Yes	Yes	Black or African American
282546	136-T	Female	Melanoma	Skin	Tumor Biopsy	Not Reported	Yes	No	No	No	No	White
383228	195-B	Male	Melanoma	Skin	Resection	Not Reported	Yes	Yes	Yes	Yes	Yes	White
289254	911-B	Male	Melanoma	Skin	Resection	Yes	Yes	Yes	Yes	Yes	Yes	White
322827	281-B	Male	Melanoma	Skin	Resection	Not Reported	Yes	Yes	Yes	Yes	Yes	White

4.2 EXAMPLE 2: Navigating Patient Samples

4.2.1 Search for patient ID 521955 in the **All Distribution Material** sub-tab of the Distribution Lots tab.

4.2.1.1 This patient has 9 models for distribution. Each model has a unique Distribution Lot Name (used for requests).

4.2.1.2 Four (4) SPECIMENS gave rise to the 9 models (e.g., specimen 158-R2 gave rise to 3 models – a PDX, PDC, and PDORG model)

4.2.1.3 If we search for this patient ID under the ‘Patient-Derived Xenograft Samples’ or ‘in Vitro Cultures’ sub-tab, only the specific sample types for the model would be retrieved.

Home Patient Patient Specimen Sample (PDX or In Vitro Culture) **Distribution Lots** Genomic Analysis Reports Search

Patient-Derived Xenograft Samples In Vitro Cultures **All Distribution Material**

Find Distribution Lot

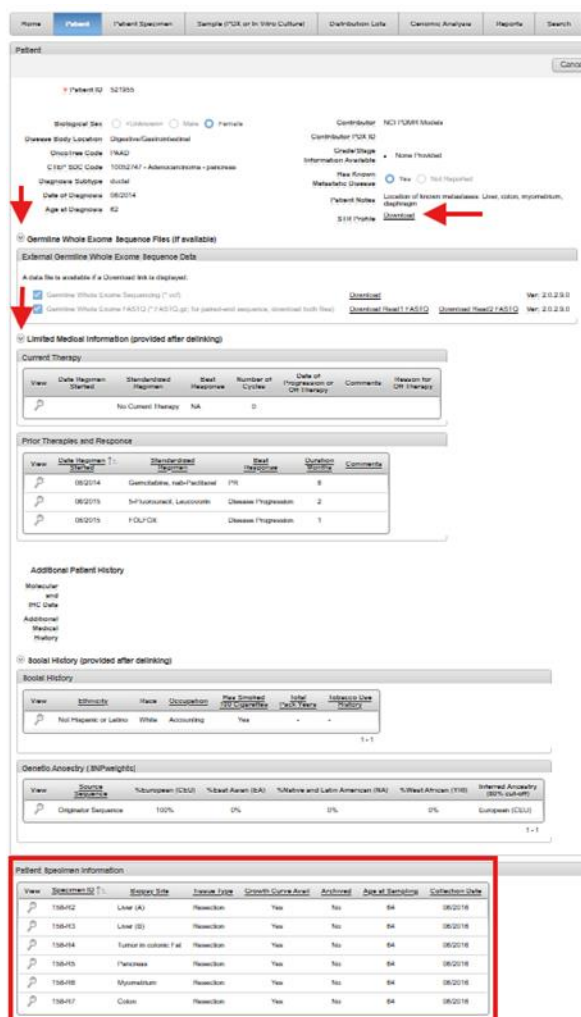
Only Show Models with Multiple Distribution Lots Available

Q: Row text contains '521955' Go Rows 100 Actions Export

View	PDM Type	Patient ID	Specimen ID	Sample ID	Distribution Lot Name	CTEP SDC Code	CTEP SDC Description	Disease Body Location	Max. Passage	Cr. PDX
	PDX	521955	158-R2	N/A	521955-158-R2	10052747	Adenocarcinoma - pancreas	Digestive/Gastrointestinal	2	Avail
	PDC: Mixed Tumor Culture	521955	158-R2	J5-PDC	521955-158-R2-J5-PDC	10052747	Adenocarcinoma - pancreas	Digestive/Gastrointestinal	18	Not /
	Organoid Culture	521955	158-R2	V5-organoid	521955-158-R2-V5-organoid	10052747	Adenocarcinoma - pancreas	Digestive/Gastrointestinal	14	Not /
	PDX	521955	158-R3	N/A	521955-158-R3	10052747	Adenocarcinoma - pancreas	Digestive/Gastrointestinal	4	Avail
	PDC: Mixed Tumor Culture	521955	158-R3	J6-PDC	521955-158-R3-J6-PDC	10052747	Adenocarcinoma - pancreas	Digestive/Gastrointestinal	25	Not /
	PDX	521955	158-R4	N/A	521955-158-R4	10052747	Adenocarcinoma - pancreas	Digestive/Gastrointestinal	3	Avail
	PDX	521955	158-R6	N/A	521955-158-R6	10052747	Adenocarcinoma - pancreas	Digestive/Gastrointestinal	3	Avail
	PDC: Mixed Tumor Culture	521955	158-R6	J3-PDC	521955-158-R6-J3-PDC	10052747	Adenocarcinoma - pancreas	Digestive/Gastrointestinal	21	Not /
	Organoid Culture	521955	158-R6	V4-organoid	521955-158-R6-V4-organoid	10052747	Adenocarcinoma - pancreas	Digestive/Gastrointestinal	10	Not /

4.2.2 If we click on the Patient ID 521955 (on any sample), the patient record is retrieved:

- Patient Info
- STR profile: Download link
- Germline WES (not available for this patient)
- Limited Medical Information: this patient did have therapy prior to tissue collection
- Social History: Self-reported Race and Ethnicity, Inferred Genetic Ancestry, Smoking History
- Patient Specimen Information: this patient had 4 collection sites with distributable material
 - Liver – site A
 - Liver – site B
 - Myometrium
 - Colonic Fat



Patient

Patient ID: 521955

Biological Sex: ☐ Unknown ☒ Male ☐ Female

Previous Study Location: Digestive/Gastrointestinal

Clinical Code: 1002747 - Adenocarcinoma - pancreas

Diagnosis Subtype: ductal

Date of Diagnosis: 06/2014

Age at Diagnosis: 62

Contributor: NCI PDMR Models

Contributor PDR ID: 1002747

Grading Stage: Information Available

Has Known Metastatic Disease: ☒ Yes ☐ Not Reported

Patient Notes: Location of known metastases: Liver, colon, myometrium, pleural

STR Profile: [Download](#)

Germline Whole Exome Sequence Files (if available)

External Germline Whole Exome Sequence Data

A data file is available if a Download link is displayed:

☒ Germline Whole Exome Sequencing (WES) [Download](#) Ver: 2.0.0.0

☒ Germline Whole Exome Sequencing (WES) for paired-end sequencing, download both files [Download Read1 \(FASTQ\)](#) [Download Read2 \(FASTQ\)](#) Ver: 2.0.0.0

Limited Medical Information (provided after deidentification)

Current Therapy

View	Date Therapy Started	Standardized Therapy	Best Response	Number of Cycles	Date of Progression or Off Therapy	Comments	Reason for Off Therapy
		No Current Therapy	NA	0			

Prior Therapies and Response

View	Date Therapy Started	Standardized Therapy	Best Response	Number of Cycles	Comments
	06/2014	Gemcitabine, nab-Paclitaxel	PR	8	
	06/2015	Soframycin, Leucovorin	Disease Progression	2	
	06/2015	FOLFIRI	Disease Progression	1	

Additional Patient History

Molecular and PCR Data

Additional Medical History

Social History (provided after deidentification)

View	Ethnicity	Race	Occupation	Has Smoked (at least 100 cigarettes)	Has Used Alcohol (at least 12 drinks)	Substance Use History
	Not Hispanic or Latino	White	Accounting	Yes	-	-

Genetic Ancestry (BMP weights)

View	Source Population	%European (CEU)	%Subsaharan African (SAS)	%Native and Latin American (NLA)	%East Asian (EAS)	Inferred Ancestry (95% cutoff)
	Diagnostic Sequence	100%	0%	0%	0%	European (CEU)

Patient Specimen Information

View	Specimen ID	Specimen Site	Tissue Type	Growth Cycle Assay	Anchored	Date at Biobanking	Collection Date
	158-H2	Liver (A)	Resection	Yes	No	04	06/2018
	158-H3	Liver (B)	Resection	Yes	No	04	06/2018
	158-H4	Tumor in colonic fat	Resection	Yes	No	04	06/2018
	158-H5	Pancreas	Resection	Yes	No	04	06/2018
	158-H6	Myometrium	Resection	Yes	No	04	06/2018
	158-H7	Colon	Resection	Yes	No	04	06/2018

4.2.3 Next, we will view the information for specimen 521955-158-R6. Clicking on the magnifier icon brings you to the specimen record.

4.2.3.1 Specimen Info: tissue origin, pathogen status, Mouse strain and implant site

4.2.3.2 Representative Growth Curve Data (see SOP Step 4.2.4)

4.2.3.3 Consensus WES data for Genomic Variants: is available

4.2.3.4 Distribution Lots: Material(s) available for request submission

4.2.3.5 Links to data for representative sample generated from specimen 521955-158-R6:

- 11 PDXs from passage 0-3
- 1 PDC
- 1 PDOrg
- Originator

4.2.3.6 Navigate back to the patient info using the “Open Patient” button

IMPORTANT: Not every SPECIMEN will generate multiple types of material for distribution

The screenshot displays the NCI Patient-Derived Models Repository (PDMR) Database interface. The top navigation bar includes links for Home, Patient, Patient Specimen, Sample (PDX or In Vitro Culture), Distribution Lots, Genomic Analysis, Reports, and Search. The main content area is divided into several sections:

- Specimen Info:** Displays Patient ID 521955 and Specimen ID 158-R6. It includes an "Open Patient" button and a "Cancel" button.
- Disease Body Location:** Digestive/Gastrointestinal.
- CTEP SDC Code:** 10052747 - Adenocarcinoma - pancreas.
- Tissue Type:** Resection.
- Tissue Collected:** Myometrium.
- Provided Tissue Origin Metastatic Site:** Yes (indicated by a red arrow).
- Collection Date:** 06/29/16.
- Age at Sampling:** 64.
- Archived:** Yes (indicated by a red arrow).
- IDEX Human Pathogen Testing Summary (h-MPACT):** Negative (IDEX).
- Specimen Notes:** Able to Viably Passage into Athymic Nude Mice? Yes. Mouse Strain Used for Engraftment: NSG (NOD.Cg-Prkdc^{scid}/J293bn1Wj/SzJ). Implantation Site: Subcutaneous (flank).
- PDX Growth Curve Data (if available):** A section with a "Download" button (indicated by a red arrow).
- Consensus Genomic Variants from WES Files:** A section with a "Download" button (indicated by a red arrow).
- Distribution Lots:** A table showing the distribution of materials for specimen 521955-158-R6. The table has columns for View, PDM Type, Name, Max. Passage, Cryopreserved for PDX Generation, In Vitro Culture Material, PDX DNA Yields, PDX RNA Yields, and PDX Fresh-Frozen Yields. The table lists 11 PDXs from passage 0-3, 1 PDC, 1 PDOrg, and the Originator.

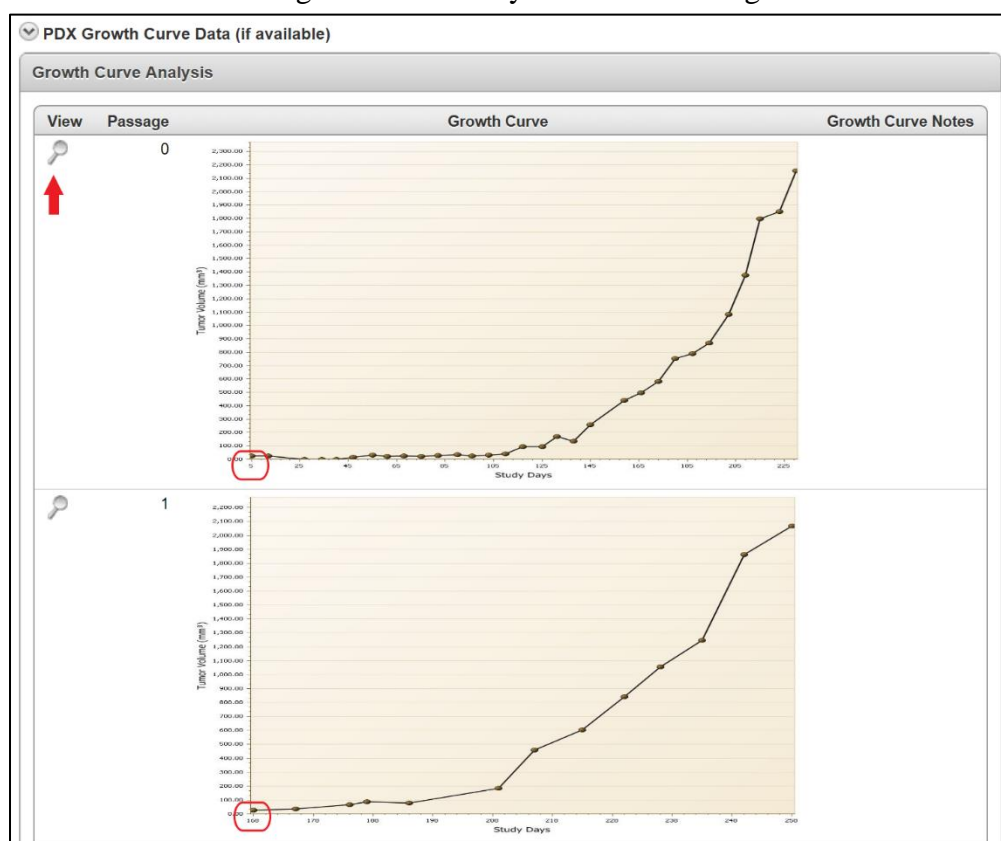
The "Distribution Lots" table is highlighted with a red box. The "Sample (PDX)" table is also highlighted with a red box. The "Sample (PDX)" table has columns for View, PDM Type, Sample ID, Patient/Originating Specimen, PDX Passage, Sample Images Avail, NCI Cancer Gene Panel Data, Whole Exome Sequence Avail, and RNASeq Avail. The table lists 11 PDXs from passage 0-3, 1 PDC, 1 PDOrg, and the Originator.

4.2.4 To view the representative Growth Curve Data for PDXs, expand the section

4.2.4.1 PDX Growth Curve Data: shows JPEGs of the Growth Curves for consecutive passages. These are provided to give researchers an idea of growth rate for models.

4.2.4.2 NOTE: Pay attention to the Study Days (x-axis) as it refers to the day of implant from passage 0

- In this example, passage 1 implant began at ~Day 170. Tumor volume reached 1000mg at ~ Day 230. So, passage 1 took 60 days to reach 1000mg.
- Passage 0 took 200 days to reach 1000mg.



4.2.5 Next, we will view the PDX sample information (blue box in SOP Step 4.2.3.6). Clicking on the magnifier icon will bring you to the Sample record.

- Sample Info
- WES and RNASeq: available, download
- NCI Cancer Gene Panel: mutations
- Specimen notes (if available)
- Pathology Data: click on the magnifier for more info
 - Pathology Notes
 - Download images
 - Click on “Open Sample” to return to sample page

The screenshot shows the 'Sample' record page for Patient ID 158-R6 and Sample ID H4CGA1. The 'Pathology Data' section is highlighted with a red box, showing a table with columns for View, Gene, AA Change, Cosmic ID, Abundance, Read Depth, and Impact. The table lists two mutations: TP53 -158 and KRAS G12D. The 'Open Sample' button is highlighted with a red box.

The screenshot shows the 'Pathology' page for Patient ID 158-R6 and Sample ID H4CGA1. The 'Pathology' section is highlighted with a red box, showing a table with columns for View, Gene, AA Change, Cosmic ID, Abundance, Read Depth, and Impact. The table lists two mutations: TP53 -158 and KRAS G12D. The 'Open Sample' button is highlighted with a red box.

4.2.6 Finally, we will view the PDC sample (blue box in SOP Step 4.2.3.6). Clicking on the magnifier icon will bring you to the sample record.

- In vitro Culture Conditions and Characteristics
 - Derivation
 - Required Media
 - Proliferation rate
 - Sub-culture recommendations
- Images: expand for more info
- WES and RNASeq Data: available, download
- NCI Cancer Gene Panel: mutations detected
- Navigate back to Specimen or Patient page using the nested buttons

Home
Patient
Patient Specimen
Sample (PDX or In Vitro Culture)
Distribution Lots
Genomic Analysis
Reports
Search

Sample

Patient ID 521955
Open Patient

Specimen ID 158-R6
Open Specimen

Sample ID J3-PDC

Disease Body Location Digestive/Gastrointestinal
CTEP SDC Code 10052747 - Adenocarcinoma - pancreas
PDM Type PDC: Mixed Tumor Culture
Required Media Complete DMEM/F12
Culture Origin Unknown
FACS Characterization mMHC-, hHLA+, mCD9-, hCD9+, hEpCAM+, hCD90-, hCD24+
Growth Properties Adherent Monolayer
Proliferation Rate In Complete Media 43 hrs
Sub-culture Recommendations Split ratio: 1 : 3 to 1:4
Culture Derivation Isolated from a passage 0 PDX. Sorted twice for human CD9 positive cells. Determined to be a tumor by FACS analysis, qRT-PCR, cell morphology and a positive tumorigenicity test

Tumorigenic in NSG Mice Yes No
Spheroid Growth Yes No
Spheroid Growth Notes
Soft Agar Growth Yes No
Soft Agar Growth Notes
Fibroblast qRT-PCR C1 Corr -0.18
Fibroblast qRT-PCR C2 Corr -0.20
Fibroblast qRT-PCR Top Hits KRT19,KRT8,KRT7,KRT18,EPCAM

Images (if available)

Genomic Analysis

External Genetic Analysis Data

A data file is available if a Download link is displayed:

☐ Somatic Mutations Associated with Cancer (*.vcf and *.maf)
☒ Whole Exome Sequencing (*.vcf)
☒ Whole Exome FASTQ (*.FASTQ.gz; for paired-end sequence, download both files)
☒ RNASeq FASTQ (*.FASTQ.gz; for paired-end sequence, download both files)
☒ RNASeq Transcripts per Million (TPM; *.RSEM.genes.results and *.RSEM.isoforms.results tab-delimited text file)

Download

Download Read1 FASTQ

Download Read2 FASTQ

Download Read1 FASTQ

Download Read2 FASTQ

Download TPM (genes)

Download TPM (isoforms)

Ver: 2.0.1.51.0
Ver: 2.0.1.51.0
Ver: 2.0.1.4.0
Ver: 2.0.1.4.0

NCI Cancer Gene Panel

View

Gene

AA Change (canonical transcript)

Cosmic ID

Allele Frequency

Read Depth

Impact

TP53

P72R

-

0.98

92

nonsynonymous

TP53

-158

-

1.00

122

FRAME_SHIFT

MGMT

L115F

-

0.50

186

nonsynonymous

KRAS

G12D

521

0.58

226

nonsynonymous

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