

PATIENT-DERIVED MODELS REPOSITORY (PDMR) DATABASE USER HELP GUIDE

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



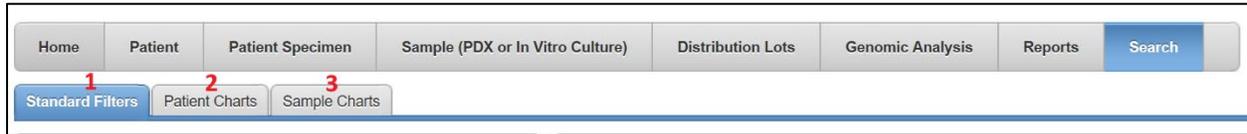
- 1.1 The PDMR database is structured in a nested fashion and includes information such as:
- 1.2 **Patient:** Patient ID, diagnosis, Grade/Stage and STR profiles of all distribution lots for the patient. The limited medical information tab (non PII) will include treatment history medical history (e.g., 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.

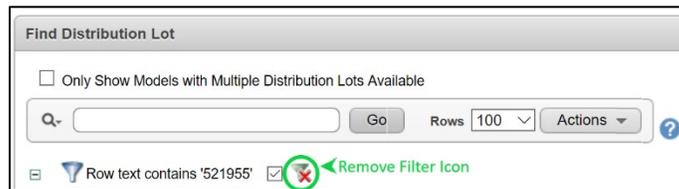
3.2 Option 2: DISTRIBUTION LOTS Tab



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.”

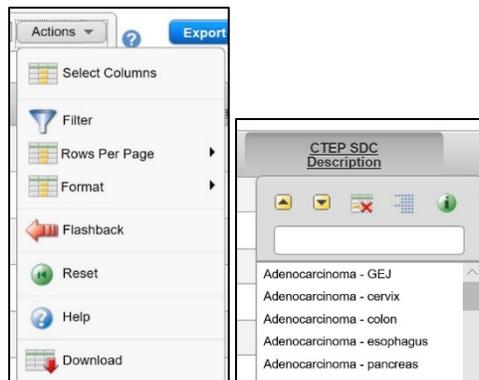


3.3 Advanced Users

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

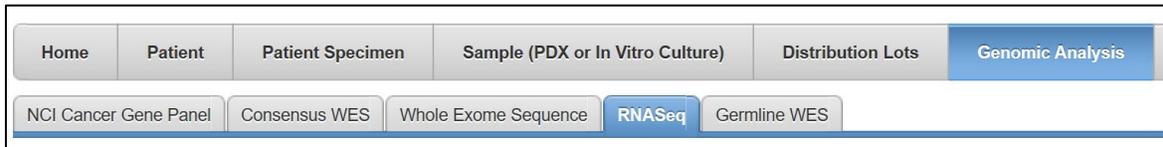


3.4 Search for Next-generation sequencing (NGS) Data

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.

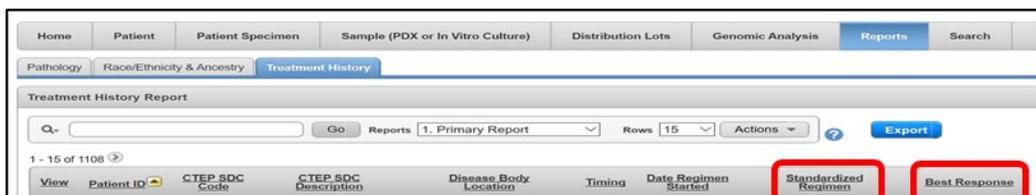


- RNASeq: Gene expression for individual samples (.fastq and .tpm).
- Whole Exome Sequence (WES): Sequence files for individual samples (.fastq and .vcf)
- Consensus WES: reports variants present in 100% of the sequenced PDX samples
- Cancer Gene Panel: Detailed list of variants in genes implicated in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

3.5 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 are (Left image below).

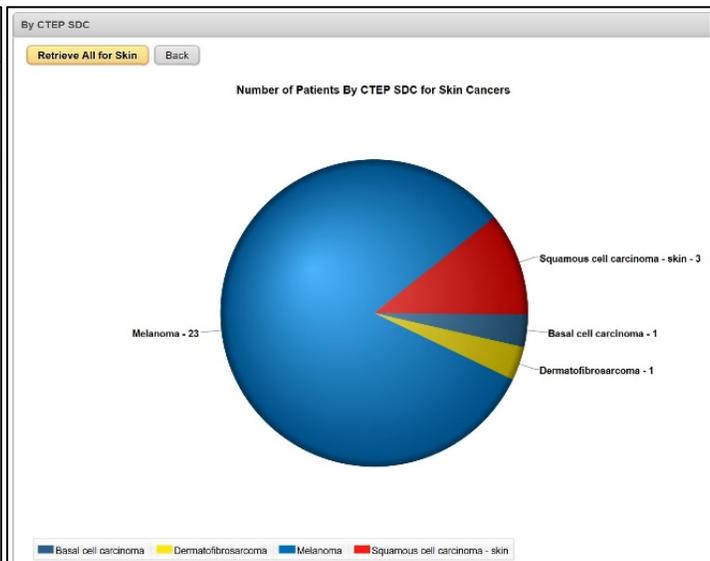
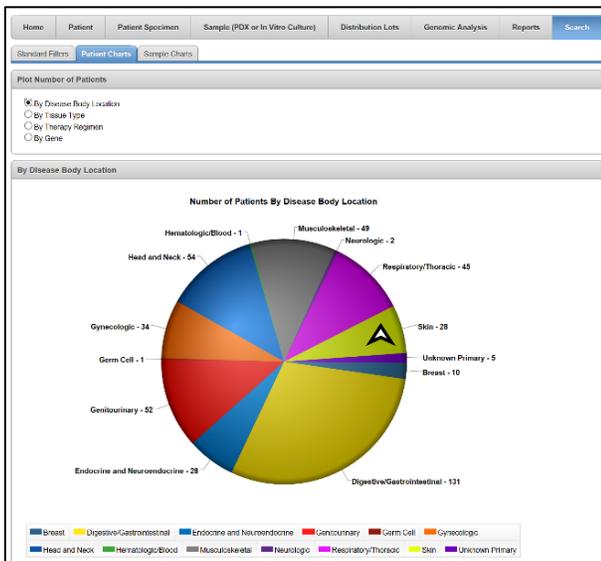
4.1.4 This brings us to a pie chart of different types of Skin cancer.

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

Applied Search Filters (1)

Search Parameters

Search Results

Patient ID	Specimen ID	Gender	CTEP SDC Code	CTEP SDC Description	Disease Body Location	Tissue Type	Has Metastatic Resection	Has Image Data	NCI Clinical Center Data	Whole Exome Sequencing Avail	RNAseq Avail	GermLine Avail	Growth curve Avail	Self-Reported Race
128128	338-R	Male	1005371	Melanoma	Skin	Resection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	White
137949	337-R	Male	1005371	Melanoma	Skin	Resection	Unknown	Yes	Yes	Yes	Yes	Yes	Yes	Black or African American
156861	154-R	Female	1005371	Melanoma	Skin	Resection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not Provided
174841	120-T	Male	1005371	Melanoma	Skin	Tumor Biopsy	Unknown	Yes	Yes	Yes	Yes	Yes	Yes	White
182917	245-R	Female	1005371	Melanoma	Skin	Resection	Unknown	Yes	Yes	Yes	Yes	Yes	Yes	White
251568	266-R	Male	1005371	Melanoma	Skin	Resection	Yes	Yes	No	No	No	Yes	Yes	White
283228	195-R	Male	1005371	Melanoma	Skin	Resection	Unknown	Yes	Yes	Yes	Yes	Yes	Yes	White
292624	011-R	Male	1005371	Melanoma	Skin	Resection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	White
324944	112-T	Female	1005371	Melanoma	Skin	Tumor Biopsy	Unknown	Yes	Yes	Yes	Yes	Yes	No	White
425562	245-T	Male	1005371	Melanoma	Skin	Tumor Biopsy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	White
476673	061-R	Female	1005371	Melanoma	Skin	Resection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	White
515677	202-R	Female	1005371	Melanoma	Skin	Resection	Unknown	Yes	Yes	Yes	Yes	Yes	Yes	White
563368	261-R	Female	1005371	Melanoma	Skin	Resection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not Provided
671166	155-R	Female	1005371	Melanoma	Skin	Resection	Yes	Yes	No	No	No	No	No	White
633993	097-R	Female	1005371	Melanoma	Skin	Resection	Unknown	Yes	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	V6-organoid	521955-158-R6-V6-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

External Germline Whole Exome Sequence Data

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

- Germline Whole Exome Sequencing ("v16)
- Germline Whole Exome FASTQ ("FASTQ.gz" for paired-end sequenc, download both files)

Limited Medical Information (provided after deidentifying)

Current Therapy

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

Prior Therapies and Responses

View	Date Reported	Standardized Regimen	Best Response	Duration Months	Comments
	06/2014	Gemcitabine, nab-Paclitaxel	PR	8	
	06/2015	S-Floxuracil, Leucovorin	Disease Progression	2	
	06/2016	PDL/PDX	Disease Progression	1	

Additional Patient History

Social History (provided after deidentifying)

View	Ethnicity	Race	Occupation	Has Smoked 100 Cigarettes	Total Pack Years	Tobacco Use History
	Not Hispanic or Latino	White	Accounting	Yes	-	-

Genetic Ancestry (SNPweights)

View	SNPweights	%European (CEU)	%East Asian (EA)	%Native and Latin American (NA)	%West African (YRI)	Inferred Ancestry (95% not off)
	Originator Sequence	100%	0%	0%	0%	European (CEU)

Patient Specimen Information

View	Specimen ID	Biopsy Site	Tissue Type	Growth Curve Avail	Archived	Age at Biopsy	Collection Date
	150-A2	Liver (A)	Resection	Yes	No	64	06/2016
	150-A3	Liver (B)	Resection	Yes	No	64	06/2016
	150-B0	Myometrium	Resection	Yes	No	64	06/2016
	150-B4	Tumor in colonic Fat	Resection	Yes	No	64	06/2016

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

Specimen

Patient ID: 521955 [Open Patient](#)

Specimen ID: 158-R6

Disease Body Location: Digestive/Gastrointestinal

CTEP SOC Code: 10652747 - Adenocarcinoma - pancreas

Tissue Type: Resection

Tissue Collected: Myometrium

Collection Date: 06/2016

Age at Sampling: 64

Archived: Yes No

PDX Growth Curve Data (if available)

Consensus Genomic Variants from WES Files

External Consensus Genomic Variants Data

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

Consensus Whole Exome Sequence (.vcf) [Download](#) Ver: 2.0

Consensus Whole Exome Sequence, annotated (.maf) [Download](#) Ver: 2.0

View	PDM Type	Name	Max. Passage	Cryopreserved for PDX Generation	In Vitro Culture Material	PDX DNA Viability	PDX RNA Viability	PDX Flash-Frozen Viability
	PDX	521955-158-R6	3	Available	Not Applicable	Available Upon Request	Available Upon Request	Available
	PDC Mixed Tumor Culture	521955-158-R6-J3-PDC	21	Not Applicable	Available	Not Applicable	Not Applicable	Not Applicable
	Organoid Culture	521955-158-R6-V4-organoid	10	Not Applicable	Available	Not Applicable	Not Applicable	Not Applicable

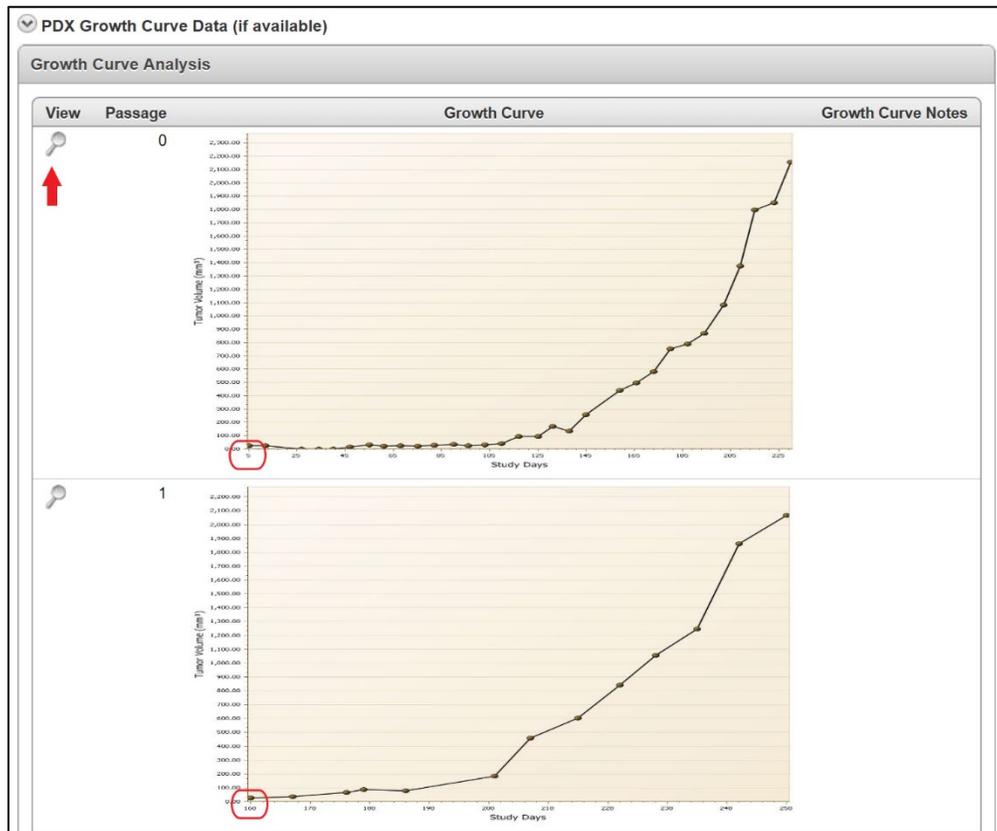
View	PDM Type	Sample ID	Patient/Originating Specimen	PDX Passage	Sample Images Avail	NCI Cancer Gene Panel Data	Whole Exome Sequence Avail	RNASeq Avail
	Organoid Culture	V4-organoid	No	No	Yes	Yes	Yes	Yes
	PDC Mixed Tumor Culture	J3-PDC	No	0	Yes	Yes	Yes	Yes
	PDX	H2C	No	0	Yes	Yes	Yes	Yes
	PDX	H3C	No	0	Yes	Yes	Yes	Yes
	PDX	H3CDV3FT4	No	2	Yes	No	No	No
	PDX	H3CDV4FV5	No	2	No	Yes	Yes	Yes
	PDX	H3CDV4FV7	No	2	Yes	No	No	No
	PDX	H3CDV5FKGGV8	No	3	No	Yes	Yes	Yes
	PDX	H4C	No	0	Yes	No	No	No
	PDX	H4CGA1	No	1	Yes	Yes	Yes	Yes
	PDX	H5C	No	0	Yes	No	No	No
	PDX	H5CDV3	No	1	Yes	No	No	No
	PDX	H5CDV3GN6	No	2	No	Yes	Yes	Yes
	Patient/Originator Specimen	ORIGINATOR	Yes		Yes	Yes	Yes	Yes

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.

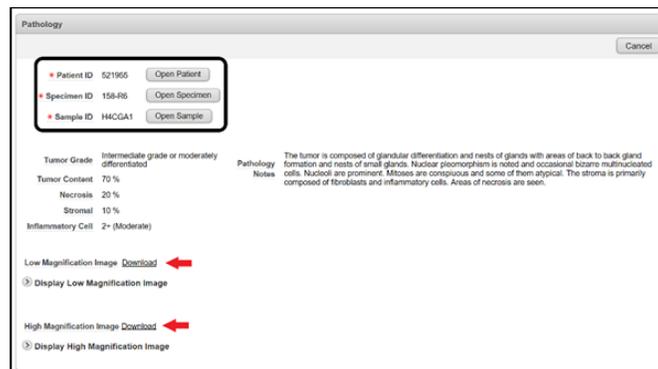
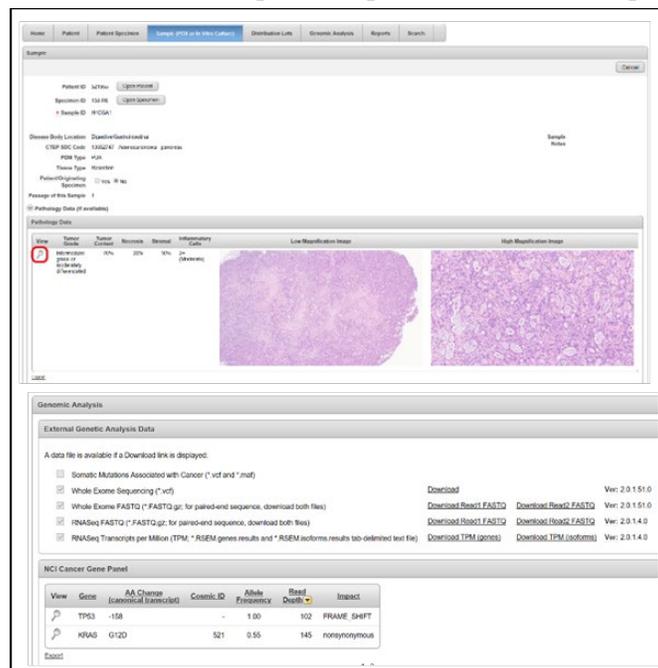
4.2.4.2 NOTE: Pay attention to the Study Days (x-axis) as it refers to the day of implant from passage 0

- 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



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

The screenshot displays the 'Sample' record for Patient ID 521955, Specimen ID 158-R6, and Sample ID J3-PDC. The record includes various attributes such as Disease Body Location (Digestive/Gastrointestinal), CTEP SDC Code (10052747 - Adenocarcinoma - pancreas), PDM Type (PDC: Mixed Tumor Culture), Required Media (Complete DMEMF12), 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), and 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).

Genomic Analysis data is available for download, including 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), and RNASeq Transcripts per Million (TPM; *RSEM.genes.results and *RSEM.isoforms.results tab-delimited text file).

The NCI Cancer Gene Panel shows the following mutations:

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