Imaging characterization of a metastatic patient derived model of melanoma: (PDMR-425362-245-T)

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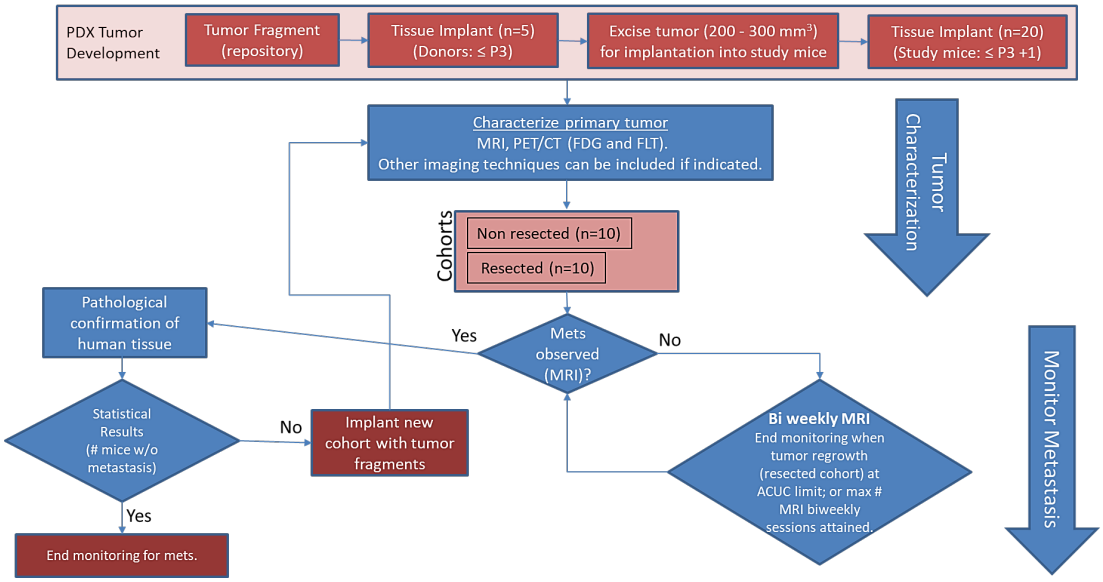
Summary

Pre-clinical animal models of spontaneous metastatic cancer are infrequent; the few that exist are resource intensive because determination of the presence of metastatic disease, metastatic burden, and response to therapy normally require multiple timed cohorts with animal sacrifice and extensive pathological examination. We identified and characterized a patient derived xenograft model with metastatic potential, melanoma xenograft 425362-245-T. In this study we performed a detailed imaging characterization (workflow below) of this model, which develops spontaneous lung metastases, details are provided in the attached standard operating procedures. Tumors in half of the mice were resected in the range 200-300 mm^3 size; tumors in the other half were allowed to grow until it was necessary to euthanize them because of tumor size.

Workflow: Characterization of PDX primary tumor and metastasis



The imaging characteristics of this model (PDMR-425362-245-T) which is available from the National Cancer Institute Patient-Derived Models Repository (https://pdmr.cancer.gov/), is highly favorable for preclinical research studies of metastatic disease when used in conjunction with non-contrast T2 weighted MRI.

Results: Melanoma (PDMR-425362-245-T)

Table 1: Penetrance and location of pathological confirmed metastatic lesion(s).

# animals in group	# animals that displayed metastasis in MRI and confirmed by Pathology	Pathology confirmation of MRI (primary imaging site)	Other confirmed Location (s)	Mouse ID: MRI with pathology confirmation of metastasis
10 (non-resected)	4 (6 mice were EU due to xenograft size prior to observation of metastasis)	Lung	Kidney	1512, 1516, 1518, 1520

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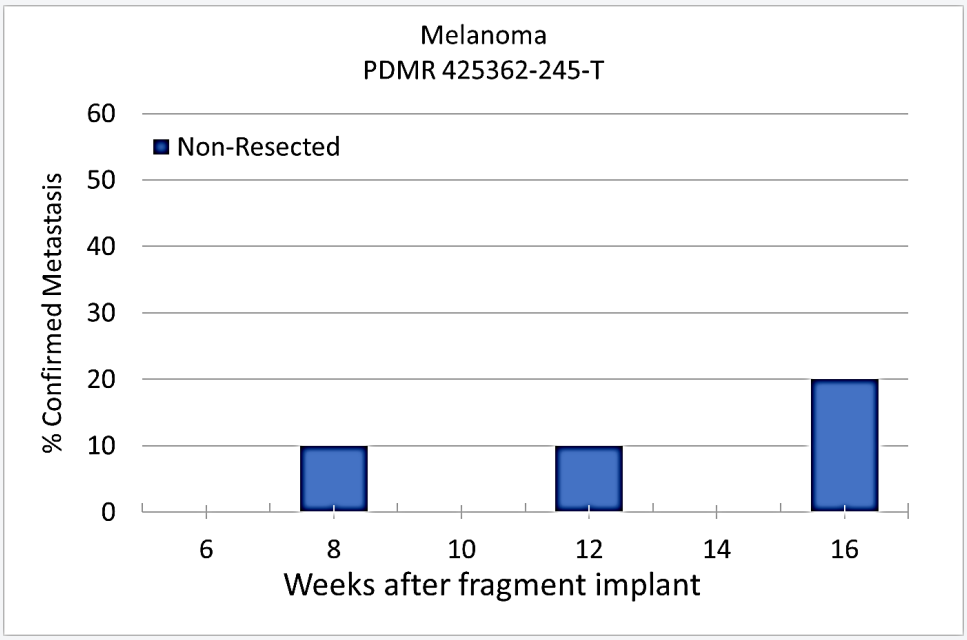
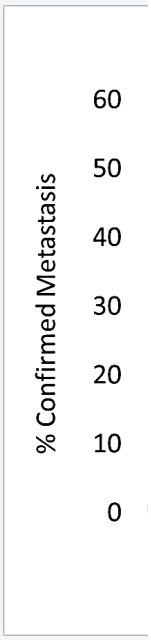
10 (resected)	10	Lung	Kidney, Liver, Pancreas	1506, 1508, 1509, 1510, 1511, 1515, 1517, 1519, 1521, 1523

Percent penetrance with respect to the average time-to-metastasis for non-resected (plot A: time from implant) and resected (plot B: time from tumor resection) cohorts.



Plot A



Plot B

PET/CT Characterization of the primary tumor: Baseline PET (SOP attached) were performed when tumor reached an approximate 200 mm^3. Average SUVmax values (n=5) were calculated; [^{18}F]FDG: 2.7 ± 0.5 and [^{18}F]FLT: 2.0 ± 0.3.

Conclusion:

Melanoma PDMR-425362-245-T model can be challenging due to the rapid growth of the xenograft and regrowth. Metastases was well observed on T2 MRI imaging allowing non-invasive evaluation in treatment trials.

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Data Access

Data Type	Download all or Query/Filter	License
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SR Conversion Routine (zip, 9 kB) (Converts a tracking spreadsheet into a DICOM Structured Report)	*Download*	CC BY 4.0
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Additional Resources for this Dataset

The National Cancer Institute (NCI) has developed a national repository of Patient-Derived Models (PDMs) comprised of patient-derived xenografts (PDXs), in vitro patient-derived tumor cell cultures (PDCs) and cancer associated fibroblasts (CAFs) as well as patient-derived organoids (PDOrg). These models serve as a resource for public-private partnerships and for academic drug discovery efforts. These PDMs are clinically-annotated with molecular information and made available in the Patient-Derived Model Repository. Data related to the specific subjects in this Collection can be found at:

- PDMR-425362-245-T

The NCI Cancer Research Data Commons (CRDC) provides access to additional data and a cloud-based data science infrastructure that connects data sets with analytics tools to allow users to share, integrate, analyze, and visualize cancer research data.

- Imaging Data Commons (IDC) (Imaging Data)

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Detailed Description

Detailed Description

Image Statistics	
Modalities	MR, SR
Number of Subjects	20
Number of Studies	115
Number of Series	210
Number of Images	3509
Images Size (GB)	2.3 GB

In addition to images, this collection includes Raw Data Storage SOP Class instances with **MR Modality**, generated by a Philips MR scanner; this data is not useful to anyone without the proprietary software to interpret it.

Citations & Data Usage Policy

Citations & Data Usage Policy

Users must abide by the TCIA Data Usage Policy and Restrictions. Attribution should include references to the following citations:

Data Citation

Tatum, J. L., Kalen, J. D., Jacobs, P. M., Ileva, L. V., Riffle, L. A., Keita, S., Patel, N., Sanders, C., James, A., Difilippantonio, S., Thang, L., Hollingshead, M. G., Phillips, J., Edmondson, E., Evrard, Y., Clunie, D. A., Liu, Y., Smith, K. E., Wagner, U., … Doroshow, J. H. (2020). *Imaging characterization of a metastatic patient derived model of melanoma: (PDMR-425362-245-T)* [Data set]. The Cancer Imaging Archive. https://doi.org/10.7937/TCIA.2020.7YRS-7J97

TCIA Citation

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Added two supplementary files: 1) an example tracking spreadsheet for multi-cohort murine studies and 2) an SR Conversion Routine to convert the tracking spreadsheet parameters into a DICOM Structured Report (SR).

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