

NExtSEEK: Redesigning Graphical User Interface for Increased User Engagement

Charlie Demurjian, MIT

LOOKING FOR COLLABORATION TO IMPROVE USER EXPERIENCE

SEEK/NExtSEEK as a
compliance tool

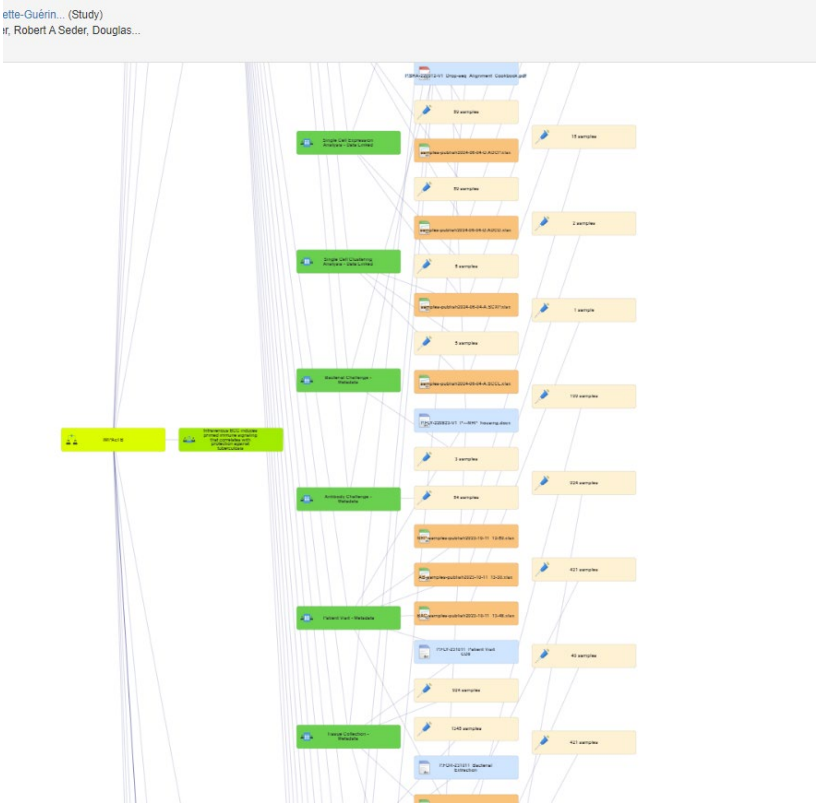
LOOKING FOR COLLABORATION TO IMPROVE USER EXPERIENCE

SEEK/NExtSEEK as a
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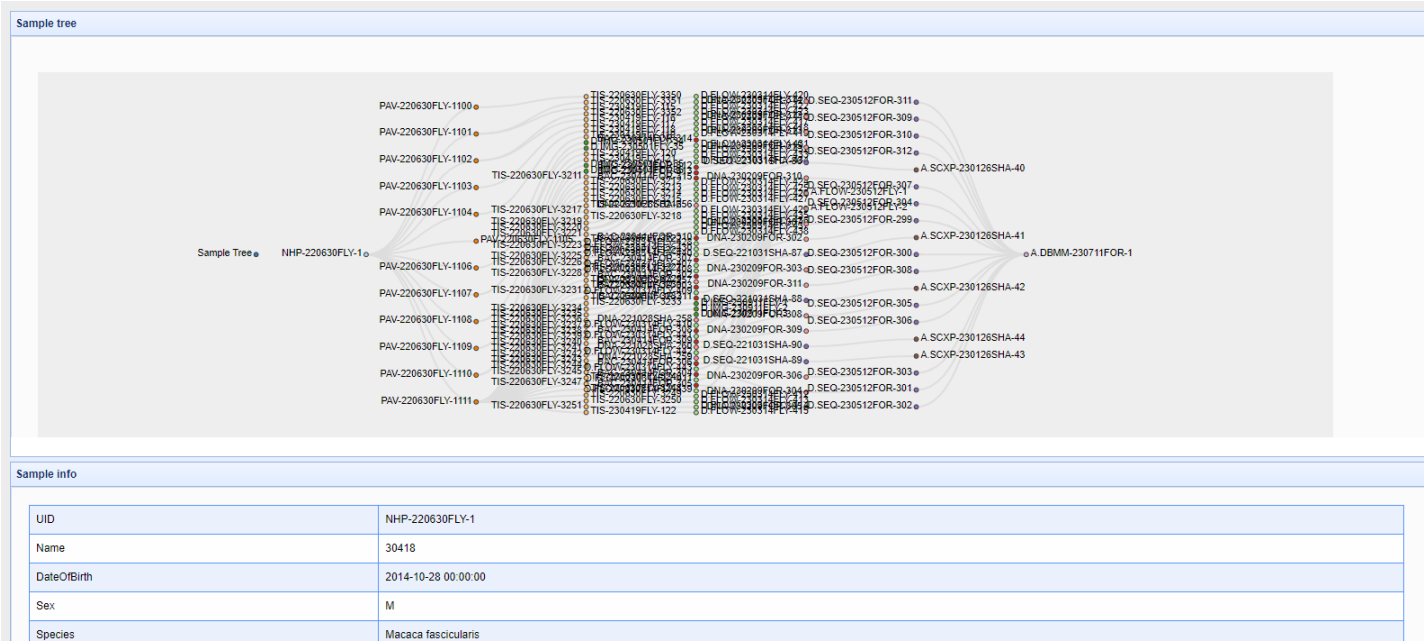


SEEK as a tool for
scientific Discovery

CURRENT VISUALIZATIONS



SEEK



NExtSEEK

VISUALIZATION THAT ENABLES DISCOVERY



Combined Study

This combined study contains samples from 3 studies

MSK-IMPACT Clinical Sequencing Cohort (MSK, Nat Med 2017)

Cancer Therapy and Clonal Hematopoiesis (MSK, Nat Genet 2020)

MSK MetTropism (MSK, Cell 2021)

Click gene symbols below or enter here

Query

Summary

Clinical Data

CN Segments

Plots **Beta!**

Selected: 60,257 patients | 60,866 samples



Custom Selection

Charts

Groups



Cancer Type		
	#	Freq
☐ Non-Small Cell Lung Cancer	9,937	16.3%
☐ Breast Cancer	7,530	12.4%
☐ Colorectal Cancer	6,708	11.0%
☐ Prostate Cancer	4,383	7.2%
☐ Pancreatic Cancer	3,908	6.4%
☐ Melanoma	2,388	3.9%
☐ Endometrial Cancer	2,364	3.9%
☐ Bladder Cancer	2,293	3.8%
☐ Ovarian Cancer	2,072	3.4%
☐ Soft Tissue Sarcoma	1,943	3.2%
☐ Esophagogastric Cancer	1,863	3.1%

Number of Samples Per Patient

Sex

Cancer Type Detailed		
	#	Freq
☐ Lung Adenocarcinoma	5,421	8.9%
☐ Prostate Adenocarcinoma	4,364	7.2%
☐ Invasive Breast Carcinoma	3,590	5.9%
☐ Atypical Lung Carcinoid	3,572	5.9%
☐ Breast Invasive Ductal Carcinoma	3,163	5.2%
☐ Colon Adenocarcinoma	3,036	5.0%
☐ Pancreatic Adenocarcinoma	2,163	3.6%
☐ Colon Adenocarcinoma In Situ	2,153	3.5%
☐ Intraductal Papillary Mucinous ...	1,424	2.3%
☐ Bladder Urothelial Carcinoma	1,273	2.1%
☐ Anaplastic Astrocytoma	1,180	1.9%

Mutation Count

NA: 18519

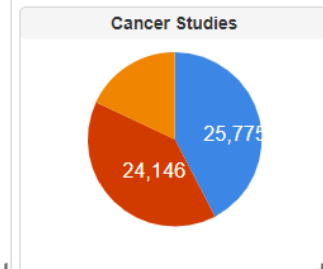
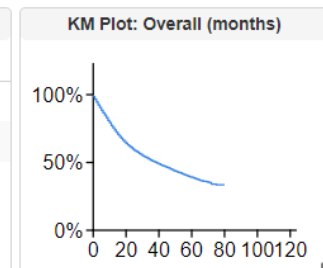
Genomic Profile Sample Counts		
Molecular Profile	#	Freq
Mutations	43,936	72.2%
Copy Number Alterations (MSK-I...	36,720	60.3%
Structural variants	36,720	60.3%

Search...

Mutation Count vs Fraction Genome Altered

800

samples



Race

NEXTSEEK: ADVANCED SEARCH

Sample Search

Sample Retrieval

Add terms to the query box:

Search Value*:

T cell depletion

Logic:

Add with AND

Sample Type (optional):

Match to Attribute Value:

☒ Partial

☐ Exact

Add

Current query box:

T cell depletion

Search

Number of samples found:

245

Number of sample types:

2

Download samples

Delete samples

Publish samples to FairdomHub

Send to Sample Retrieval

☐	ID	UID	Sample Type	Attribute:Value
☐	16894	MUS-220122SAS-325	MUS	study:Chal 86 - PWK T cell depletion
☐	16895	MUS-220122SAS-326	MUS	study:Chal 86 - PWK T cell depletion
☐	16896	MUS-220122SAS-327	MUS	study:Chal 86 - PWK T cell depletion
☐	16897	MUS-220122SAS-328	MUS	study:Chal 86 - PWK T cell depletion
☐	16898	MUS-220122SAS-329	MUS	study:Chal 86 - PWK T cell depletion
☐	16899	MUS-220122SAS-330	MUS	study:Chal 86 - PWK T cell depletion
☐	16900	MUS-220122SAS-331	MUS	study:Chal 86 - PWK T cell depletion
☐	16901	MUS-220122SAS-332	MUS	study:Chal 86 - PWK T cell depletion

NEXTSEEK: ADVANCED SEARCH

Sample Search

Sample Retrieval

Add terms to the query box:

Search Value*:

NHP

Logic:

Add with AND

Sample Type (optional):

Match to Attribute Value:

☒ Partial

☐ Exact

Add

Current query box:

(T cell depletion) AND NHP

Search

Number of samples found:80

Number of sample types:1

Download samples

Delete samples

Publish samples to FairdomHub

Send to Sample Retrieval

☐	ID ⇅	UID ⇅	Sample Type ⇅	Attribute:Value
☐	36460	NHP-220830FLY-1	NHP	funder:BMGF OPP1186181 "Understanding the mechanisms of intravenous BCGinduced protection against TB in NHP" Note: VCF paid for the monkeys (PI Flynn), stu
☐	36461	NHP-220830FLY-2	NHP	funder:BMGF OPP1186181 "Understanding the mechanisms of intravenous BCGinduced protection against TB in NHP" Note: VCF paid for the monkeys (PI Flynn), stu
☐	36462	NHP-220830FLY-3	NHP	funder:BMGF OPP1186181 "Understanding the mechanisms of intravenous BCGinduced protection against TB in NHP" Note: VCF paid for the monkeys (PI Flynn), stu
☐	36463	NHP-220830FLY-4	NHP	funder:BMGF OPP1186181 "Understanding the mechanisms of intravenous BCGinduced protection against TB in NHP" Note: VCF paid for the monkeys (PI Flynn), stu
☐	36464	NHP-220830FLY-5	NHP	funder:BMGF OPP1186181 "Understanding the mechanisms of intravenous BCGinduced protection against TB in NHP" Note: VCF paid for the monkeys (PI Flynn), stu
☐	36465	NHP-220830FLY-6	NHP	funder:BMGF OPP1186181 "Understanding the mechanisms of intravenous BCGinduced protection against TB in NHP" Note: VCF paid for the monkeys (PI Flynn), stu
☐	36466	NHP-220830FLY-7	NHP	funder:BMGF OPP1186181 "Understanding the mechanisms of intravenous BCGinduced protection against TB in NHP" Note: VCF paid for the monkeys (PI Flynn), stu
☐	36467	NHP-220830FLY-8	NHP	funder:BMGF OPP1186181 "Understanding the mechanisms of intravenous BCGinduced protection against TB in NHP" Note: VCF paid for the monkeys (PI Flynn), stu
☐	36468	NHP-220830FLY-9	NHP	funder:BMGF OPP1186181 "Understanding the mechanisms of intravenous BCGinduced protection against TB in NHP" Note: VCF paid for the monkeys (PI Flynn), stu

Sample tree



Sample info

UID	NHP-220830FLY-1
Name	3919
Sex	M
Species	Macaca mulatta
Origin	India

WHAT IS NEXSEEK?



KEY DIFFERENCES



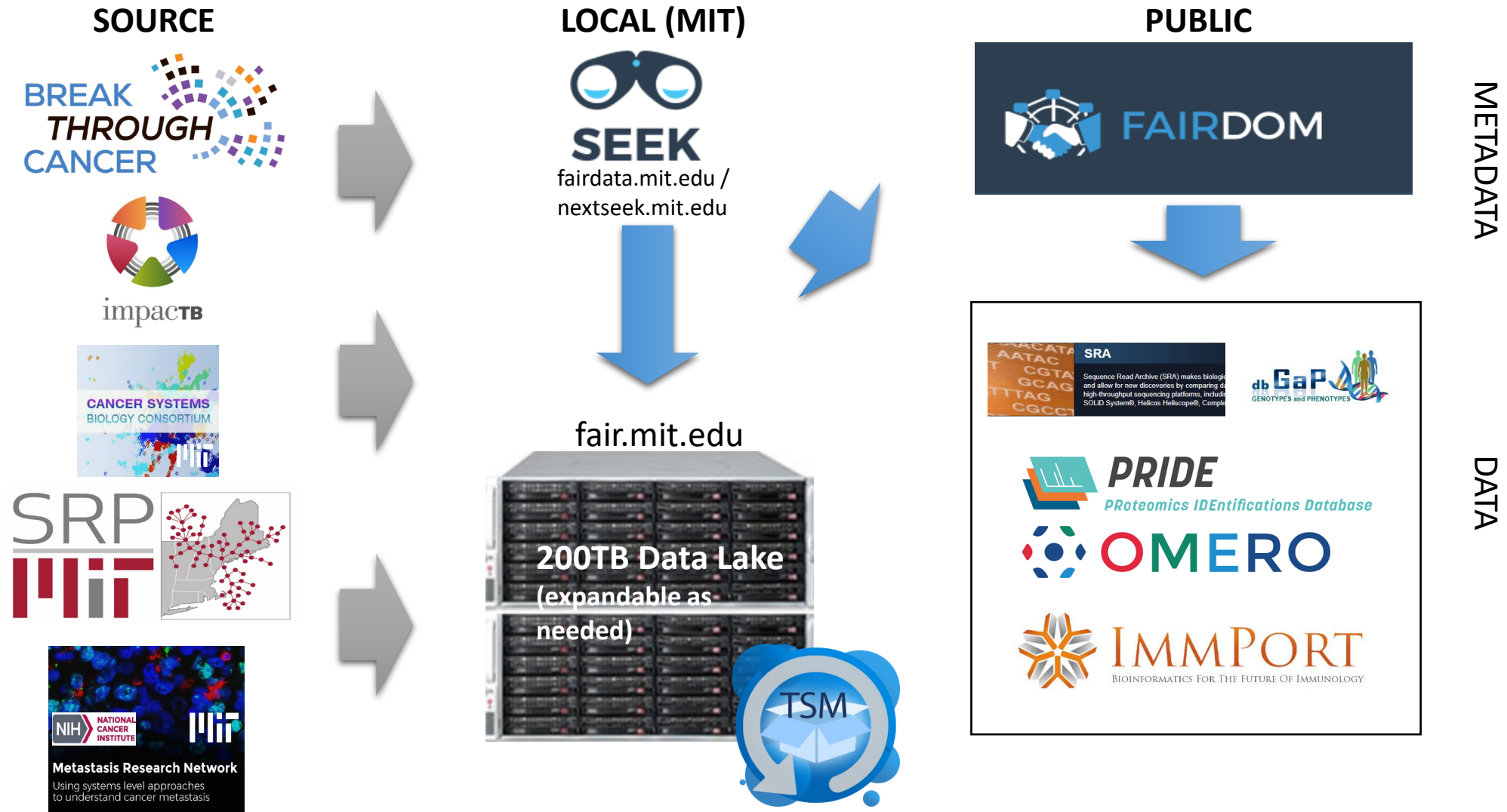
Immutable Sample Types	Mutable Sample Types
Assays are parents of samples	Assays are nodes that connect samples
Sample Sheet Uploading (containing 1 sample type)	Assay Sheet Uploading (containing multiple sample types)

<https://jbt.pubpub.org/pub/nextseek-interopaerable-data-management/release/1>



Figure 1A

NEXTSEEK DATA ARCHITECTURE



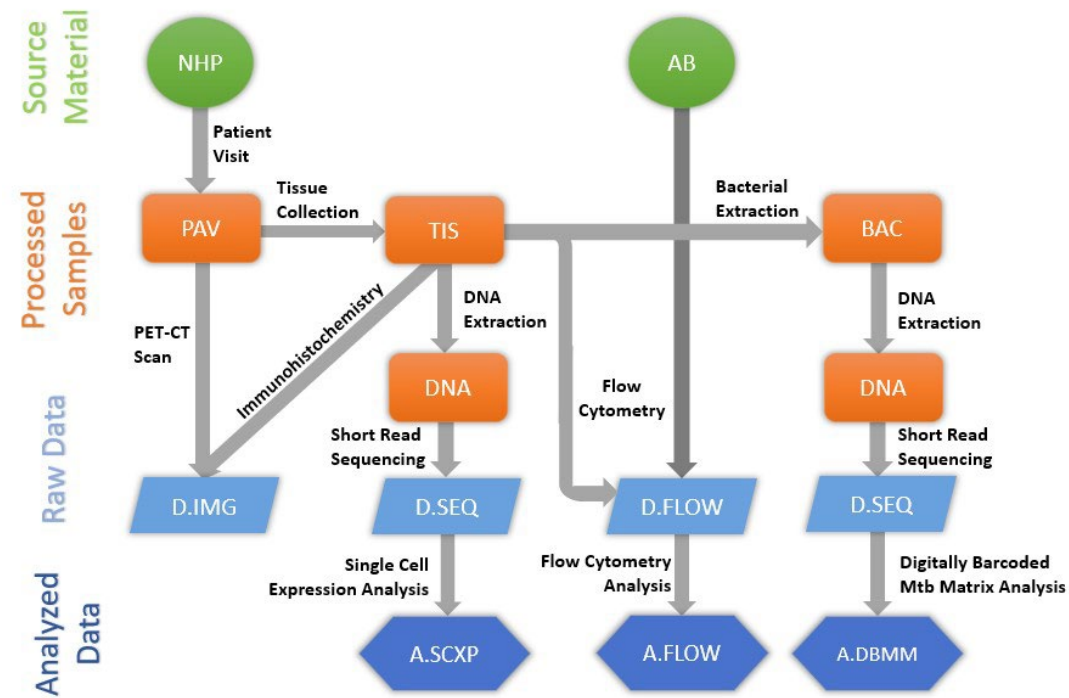
FAIRDOMHUB

 CD8+ lymphocytes are critical for early control of tuberculosis in macaques

 Unsubscribe  New Study

 Overview  Related items

Caylin G. Winchell, Sarah K. Nyquist, Michael C. Chao, Pauline Maiello, Amy J. Myers, Forrest Hopkins, Michael Chase, Hannah P. Gideon, Kush V. Patel, Joshua D. Bromley, Andrew W. Simonson, Roisin Floyd-O'Sullivan, Marc Wadsworth, Jacob M. Rosenberg, Rockib Uddin, Travis Hughes, Ryan J. Kelly, Josephine Griffo, Jaime Tomko, Edwin Klein, Bonnie Berger, Charles A. Scanga, Joshua Mattila, Sarah M. Fortune, Alex K. Shalek, Philana Ling Lin, JoAnne L. Flynn; CD8+ lymphocytes are critical for early control of tuberculosis in macaques. *J Exp Med* 4 December 2023; 220 (12): e20230707. doi: <https://doi.org/10.1084/jem.20230707>



FAIRDOMHUB

CD8+ lymphocytes are critical for early control of tuberculosis in macaques

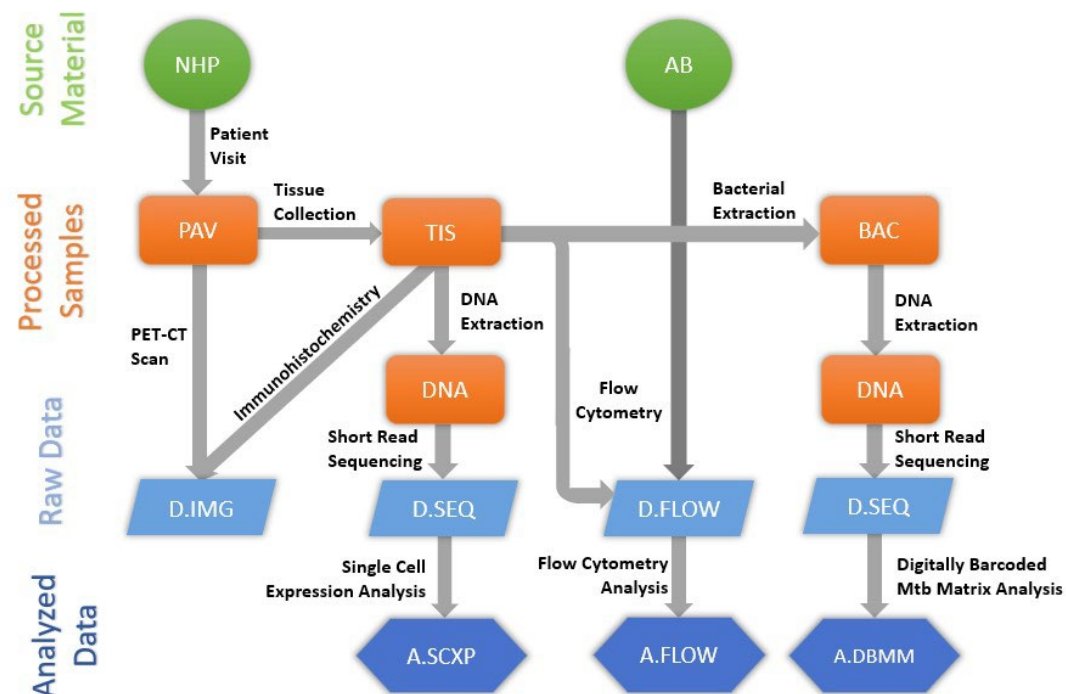
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New St

Overview

Related items

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Selected: 49 samples (Samples collection)

Description: No description

- P.SHA-220819-V1_SeqWellHughes.et.al.Master.Protocol.pdf
- P.FOR-230503-V1_Barcoding_Amplicon_Feb2023
- Short Read Sequencing - Data Linked
- 938 samples
- DNA-TIS-samples-publish2023-10-11_14-50.xlsx
- 49 samples
- DNA-BAC-samples-publish2023-10-11_14-51.xlsx
- 421 samples
- DSEQ-TIS-samples-publish2023-10-11_15-50.xlsx
- 49 samples
- DSEQ-BAC-samples-publish2023-10-11_15-51.xlsx
- 419 samples
- P.SHA-220819-V1_SeqWellHughes.et.al.Master.Protocol.pdf
- P.FOR-230503-V1_Barcoding_Amplicon_Feb2023
- P.FOR-230503-V1_Barcoding-Whole-Genome-Sequencing-Protocol.docx
- Digitally Barcoded Mtb Matrix Analysis - Data Attached

FAIRDOMHUB



CD8+ lymphocytes are critical for early control of tuberculosis in macaques

Unsubscribe

New Study

Overview

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Selected: 49 samples (Samples collection)

Description: No description

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 - P.FOR-230503-V1_Barcoding_Amplicon_Feb2023
 - P.FOR-230503-V1_Barcoding-Whole-Genome-Sequencing-Protocol.pdf
- Digitally Barcoded Mtb Matrix Analysis - Data Attached

CreationDate	Protocol	Link_PrimaryData	Parent	DataType	SequencingType
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SampleCreationDate	Search Protocol	Search Link_PrimaryData	Search Parent	Search DataType	Search SequencingType

THE TEAM AND OUR PROJECTS



Stuart Levine, PhD
Core Director



Charlie Demurjian
Lead Data Specialist



Nathan Eolin
Data Specialist



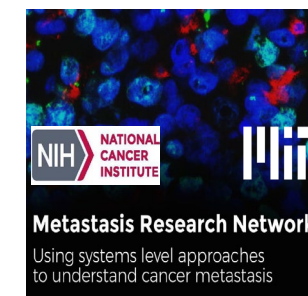
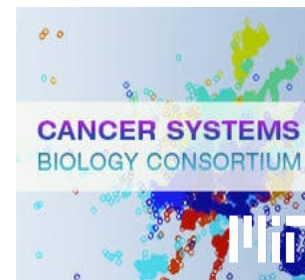
Jared Lyon
Co-op Student



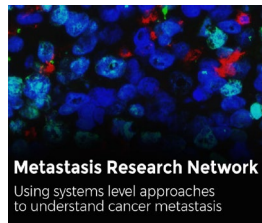
Huiming Ding, PhD
Research Computing Specialist



Allen Soberanes
IT/Systems Administrator



CURRENT STANDINGS OF PROJECTS



Total Counts

Samples	95177
Sample Types	83
Protocols	284
Data Files	21616
Assays	81
Users	77
Fairdomhub Studies	28
Public Fairdomhub Studies	17

SUCCESS STORIES

Thank you, Mike. I just now followed the link to the Github page – looks great!

Good to meet you, Douaa. Since you have been taking the lead on all this, I want to repeat how impressed I am with how organized and accessible everything is! I have been involved in enough large-scale projects to know that this is now easy to achieve.

Best,

Anonymous Researcher

In reference to: <https://fairdomhub.org/studies/1134>

HOW CAN WE IMPROVE VISUALIZATION (UI) TO INCREASE USER ENGAGEMENT & ENHANCE SCIENTIFIC DISCOVERY?

We are looking to collaborate!

- Bi-weekly meetings
- Hackathon