

Xbiom[™]:

Enabling Data Integration for Translational & Precision Medicine

Serving the Life Sciences industry since 2009



CORPORATE OFFICE's:

Foster City – California, USA Silver Spring – Maryland, USA France – Paris Bangalore – India

Xbiom is our BioPharma solutions platform for:

- Research insights from nonclinical and clinical studies, assays, biomarkers
- Validated workflows for regulatory nonclinical and clinical submission preparation
- Automated Smart Transformation for data curation from data lakes to target model
- Governance and management of standards, terminology, metadata



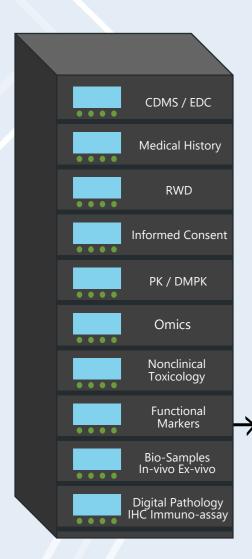






Platinum member of CDISC and contributor to PhUSE

Xbiom: Makes Data Useful





DATA CURATION

- Built-in data standards, terminology governance and management
- QC dashboard for curation and quality
- eDataValidator for verification of data against standards and controlled terminology



DATA HARMONIZATION

Xbiom ingests and index assay data from

- Discovery,
- Non-clinical
- Exploratory
- Clinical trials
- Pre-clinical
- Biomarker data
- In-vivo

..to identify signals across stratified cohorts



DATA INGESTION

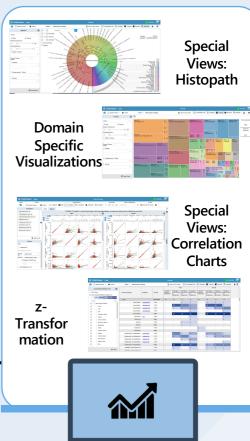
- Xbiom typically has multiple integrations to other applications, such as
- Cheminformatics
- Internal registries
- ClinOps data sources
- Biomarker databases
- MDM
- Biosamples / bio banks among others



ANALYTICS + DATA VISUALIZATION

- Xbiom enables data visualization in TLF format
- Visualization across R&D lifecycle
- F.A.I.R principle compliant
- Support maturation workflow (phase gated) and tethered workflow for samples
- · Longitudinal patient view

Immersive & Interactive Visualization



Disparate Data Sources

Xbiom™ Suite for Research & Regulatory in Clinical & Nonclinical

Insights for Translational Research Insights: Clinical And Biomarker Workbench for Translational & Biomarker Research

Insights: Nonclinical

Data Curation, Transformation, Harmonization, Quality, and Ingestion

Smart Transformation Xbiom™
built on
Metadata and
Ontology
Platform

eData Validator (SDTM, SEND)

Regulatory Data
Standardization, Submission
Planning and Preparation

Regulatory: Clinical

Regulatory: Nonclinical

What does

Smart Transformation Generate?

Xbiom Smart Transformation provides comprehensive capabilities to ingest source data by mapping and transforming to target models, harmonize terminologies and unit systems, perform data QC and make data available for Search, Aggregation, Analytics and Visualization through Xbiom UDM (integrated data hub with modelled structured data).

- Generate a Universal Data Model (UDM) that is flat, simplified, and easily indexed for search; representable as a graphed linked object (RDF, OWL) for use in SPARQL queries, and inference engines
- Smart Transformation transforms Raw, Fragmented, Non-Standard data to a standard accessible, exploitable form.

- Generate a Standard Data Model (SDM) of user's choice for exchange, access by legacy scripted queries (SDTM, ADaM, SEND, Corporate custom standards such as Research Trust DB)
- Regenerate UDM data in Xbiom repository back into any standard SDM – reuse, flexible, repurpose and drive the change in industry

Data Concierge Service: <u>Value for Biotech</u>

Smart Transformation Xbiom™ built on Metadata and Ontology Platform

eData Validator (SDTM, SEND)

The Value from Business Perspective

We are agile – our team includes

- Bioinformaticians
- Molecular Biochemists
- Data Scientists
- IT Architects and Operations
- Physicians
- Board Certified Toxicologist

We are not an IT software and services company

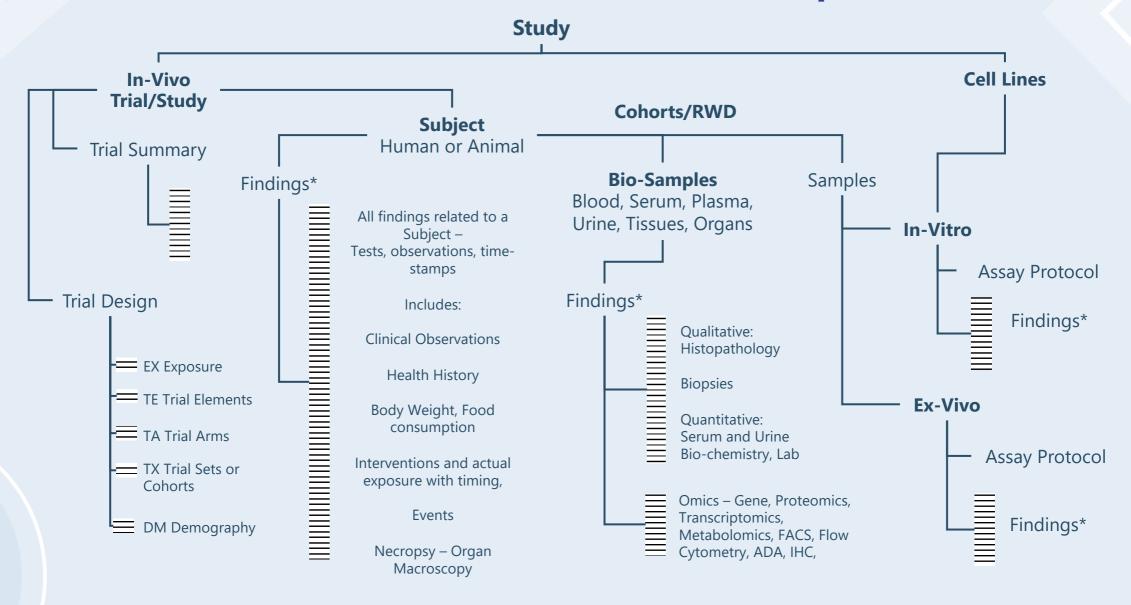
The Value from Science Perspective

- Integrate source data from CROs + labs
 - Standardize and harmonize source data into analysis-ready data
 - Search + select stratified cohorts
 - Identify data gaps and sample availability for assays
- Augments Biotech's data science to Translational teams

Normalized Omics data types in Xbiom Ontology

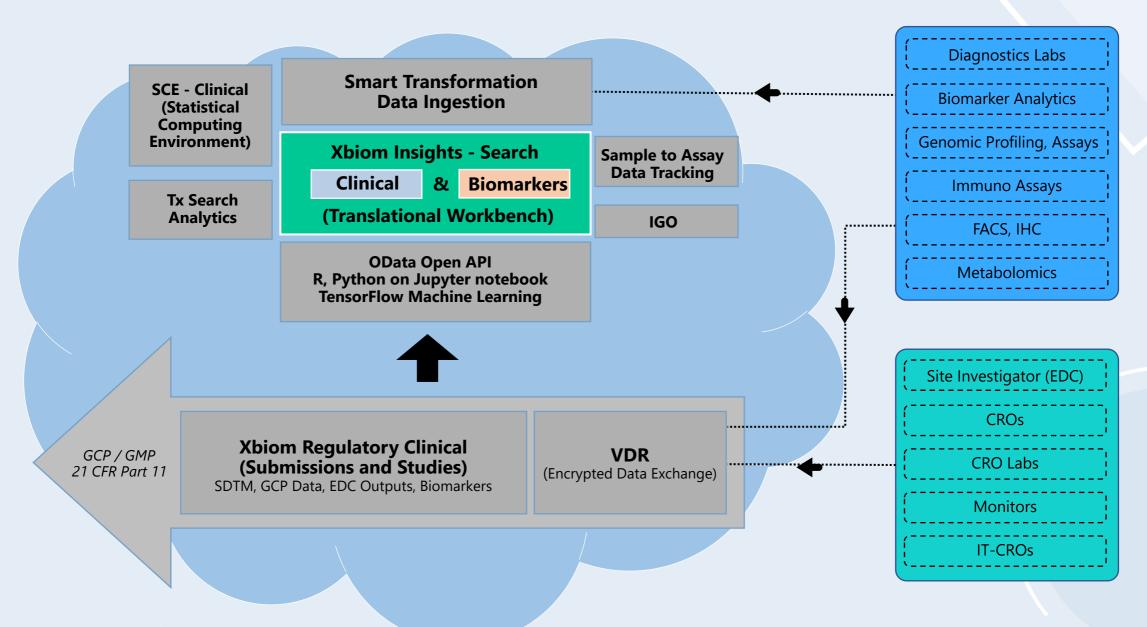
OMICS	Measurement	Measurement Types	Assays, Technologies, Methods	Data Vendors	Reference Dictionaries	Current Biomarker Counts
Genomics	Genetic Variation	Short Variant Copy Number Alteration Rearrangements	DNA Targeted Sequencing, Digital PCR	Foundation Medicines; Sysmex Inostics; Applied Biosystems	NCBI Gene Info, COSMIC	
	Sequencing	Targeted RNA Sequencing	Targeted RNA Sequencing	Illumina	NCBI Gene Info	59,670**
Transcriptomics	Expression	Gene Expression; Targeted mRNA expression	Microarray, Nanostring	AltheaDx; NanoString Technologies	NCBI Gene Info	
		*Targeted mRNA detection	qRT-PCR In situ Hybridization	Covance	miRBase	2,656 (miRNA)
	Expression	Expression of Proteins	Immunohistoche mistry	Mosaic Laboratories	UniProt (SwissProt)	563,972
Proteomics	Concentration	Concentration of Proteins	Immunoassay,ELI SA, Multiplex Assay	Myriad RBM		
	Immune cells Population	*Cell Sorting (Cluster of Differentiation) Cell surface proteins	Flow cytometry			
Metabolomics	Concentration	Concentration of Metabolites	Liquid Chromatography- Mass Spectrometry	BIOCRATES Life Sciences AG	Human Metabolome Database (HMDB)	114,260 (Metabolites)

UDM – Universal Data Model for Disparate Data



^{*} Findings are held in a common storage model with Observation/Testname, date-Time stamp, Units and other attributes

Xbiom™ Configuration for Clinical and Translational Biomarker Research







Xbiom [™] makes data useful

Live Demo

www.pointcrosslifesciences.com

Webinar on Xbiom[™]

Enabling Data Integration for Translational & Precision Medicine

Sample formats for Immunoassay data received from Vendors

STUDYID	SUBJIDN	SPID	TPT	TESTCD	ORRES	ORRESU	LLOQ	STAT	REASND	D	M	Υ	
PC123	10	01 S01	C1D1	IL_6		6.6 pg/mL	1.	.1			23	4	2019
PC123	10	01 S01	C1D1	VEGF_A		68 pg/mL	1.	.1			23	4	2019
PC123	10	01 S01	C1D1	VEGF_C		1432 pg/mL	1.	.1			23	4	2019
PC123	10	01 S01	C1D1	VEGF_D	BLQ	pg/mL	1.	.1			23	4	2019

Study	Order	TestProfile	SampleName	Species	SampleType	Anticoagulant	Analyte	Units	LDD	LLOQ	LowRange	HighRange	Result	Comment
PC001	P002	MAP	PC123, Screen	Human	Plasma	EDTA	6Ckine	pg/mL	3.6	11	357	7 1330	410)
PC001	P002	MAP	PC123, Screen	Human	Plasma	EDTA	Adiponectin	ug/mL	0.02	0.13	1.8	15	3.8	

Sample	Assay	Well	Spot	Dilution	Concentration	Sign al	Mean	Calc. Concentrati on	Calc. Conc.	Calc. Conc. Mean	SampleID	SUBJID	Compound Name	X250	Х5	Sample type
						659.										
PC001	IL-6	A03	7.00	1.00		00	598.00	0.00	52.38	0.	00 Biposysamp1	PC001-121	Vehicle			Biopsy
						536.										
PC001	GM-CSF	A04	7.00	1.00		00	598.00	0.00	52.38	0.	00 Biposysamp2	PC001-121	Vehicle			Biopsy

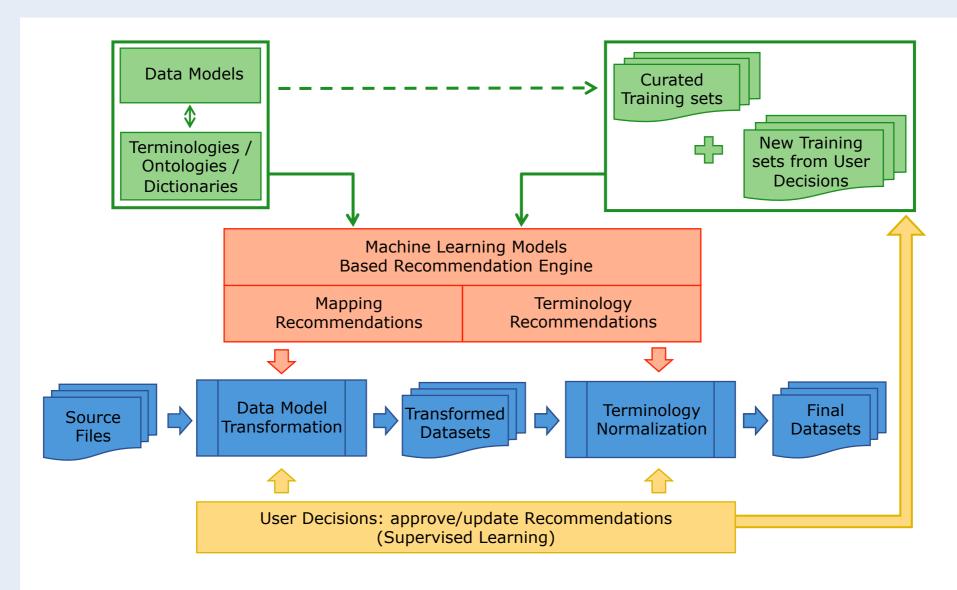
Unique Subject Identifier	Lab Test or Examination Name	Category for Lab Test	Result or Findings as Collected	Unit of the Original Result	Specimen Condition	Method of Test or Examination
PC11801	IL-6	WB	0	.6 pg/mL		Human whole Blood Assay
PC11801	IL-8	WB	282	.8 pg/mL		Human whole Blood Assay

Analytes							Granulocyte-Macrophage Colony- Stimulating Factor (GM-CSF)	Interleukin-2 (IL-2)
Units							pg/mL	pg/ml
LDD							15	82
LLOQ							29	162
Low Range								
High Range							ND	ND
Samples	SiteID	SubjectID	SampleID	Visit Type	Date of Collection	Time of Collection		
PC001S78763284	A001	PC123	54323456	C1D1	09/17/2020		43	356

Machine Readable Columnar Format

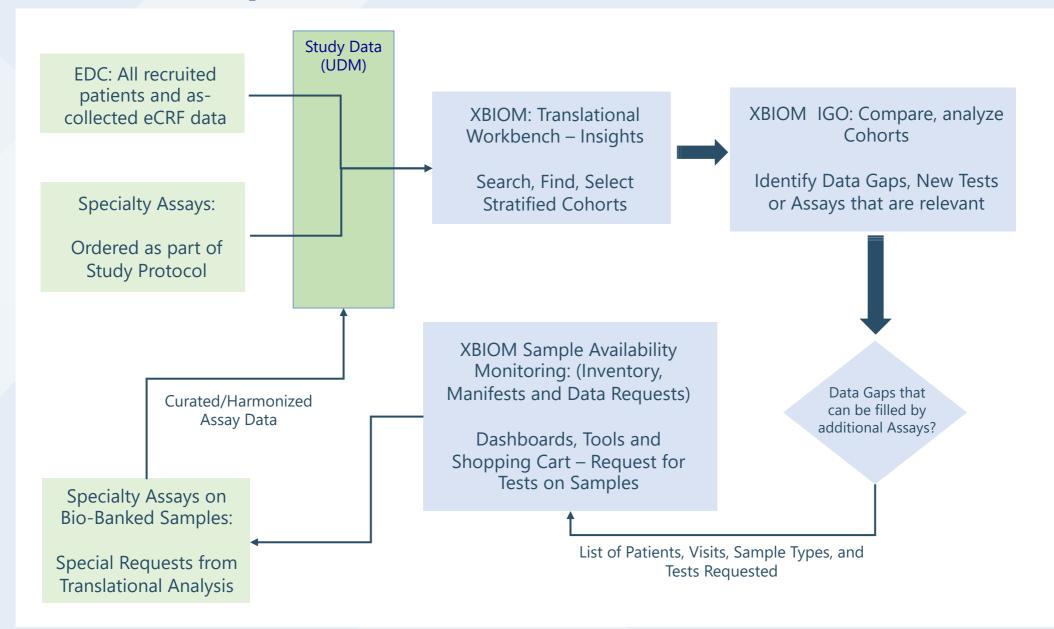
Human Readable Pivoted Format

Data Transformation and Enrichment



Workflow of Data Transformation

Assay data for translational research



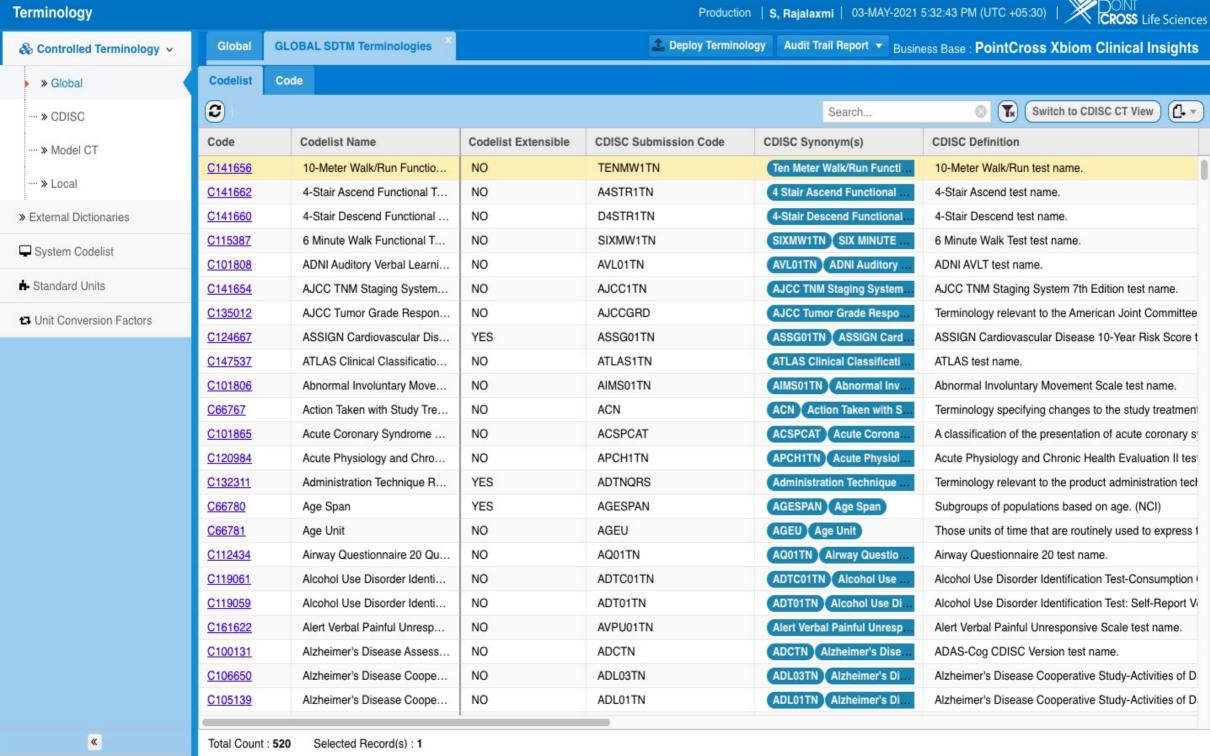


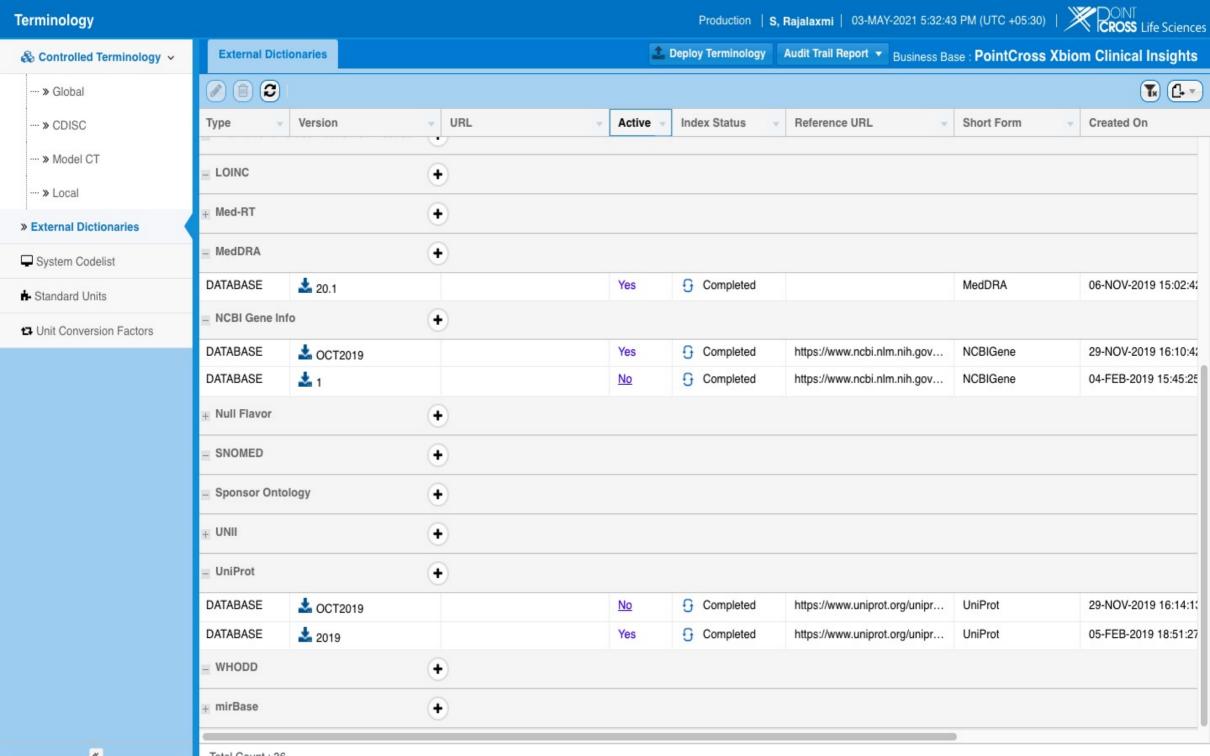


Batch ID: exvivo

Business Base: PointCross Xbiom Clinical Insights

	Batch Status : Completed	Import Batch Details Delete Initiate Process Export Batch Details
Batch Details	Batch Details	2 🖺 ∠ →
Auto Generate		
Dataset Transformations	Auto Generate	2 □ 2 ▼
Metadata Mappings		
 Terminology Normalization 	Dataset Transformations	\$ 2 □ 2 ▼
Controlled Terminology		
MedDRA	Metadata Mappings	\$5 € 1 0 2 7
NCBI Gene Info		
UniProt	Controlled Terminology	St. 27 →
mirBase		
HMDB	Additional Transformations	St. 20 12 12 12 12 12 12 12 12 12 12 12 12 12
Additional Transformations		
Derivations	Derivations	\$ 2 □ 2 ▼
Data Updates		
Output	Data Updates	
	Output	





& Controlled Terminology ~

Unit Conversion Factors

Deploy Terminology Audit Trail Report ▼ Business Base : PointCross Xbiom Clinical Insights

··· » Global

··· » CDISC

··· » Model CT

··· » Local

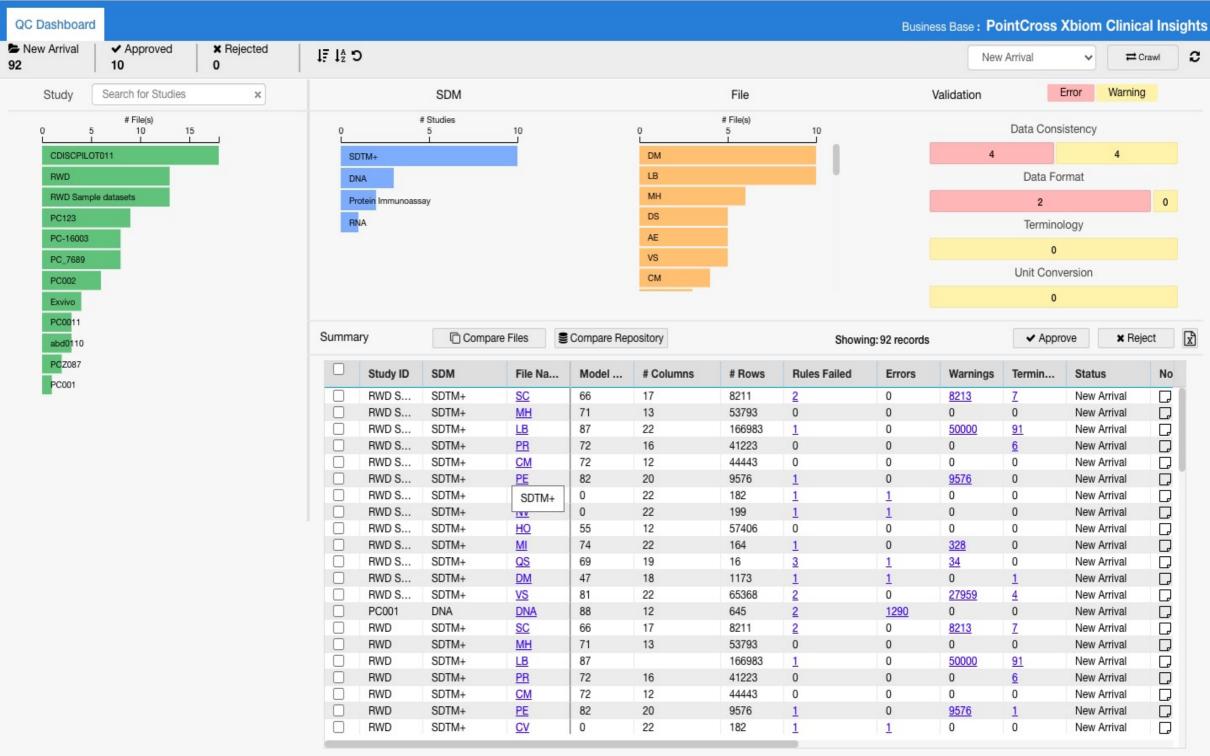
» External Dictionaries

System Codelist

★ Standard Units

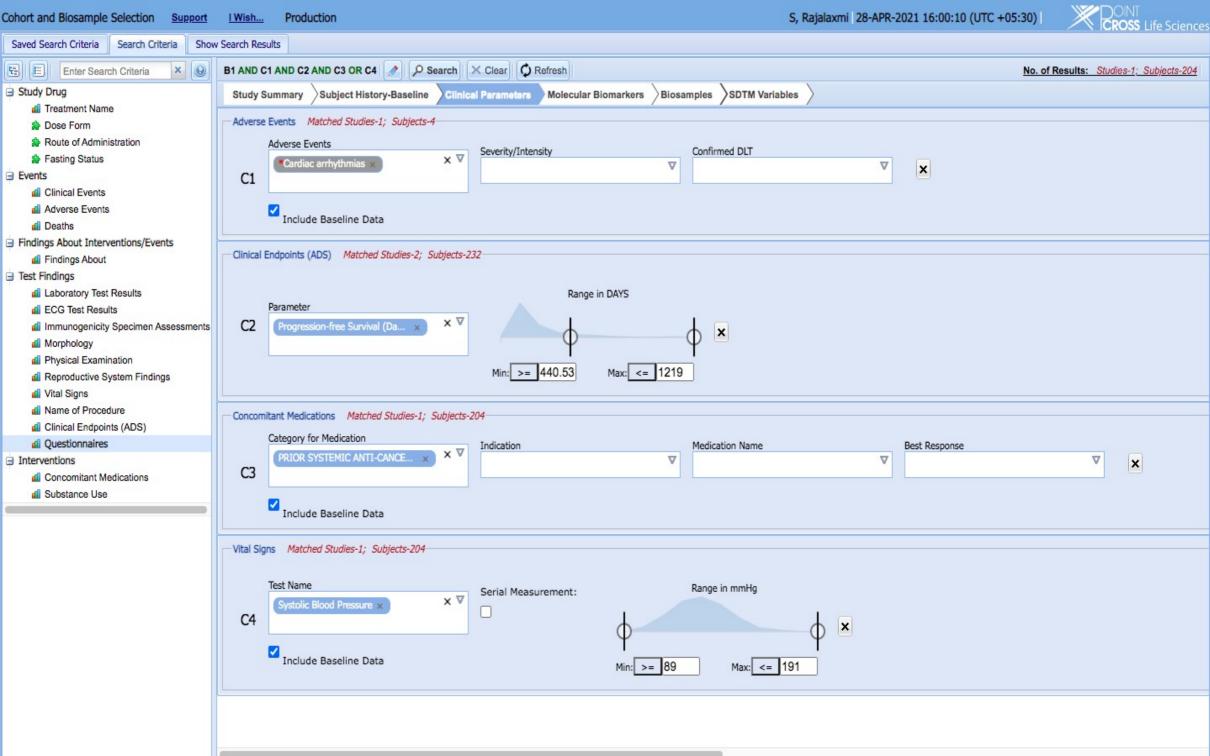
Unit Conversion Factors

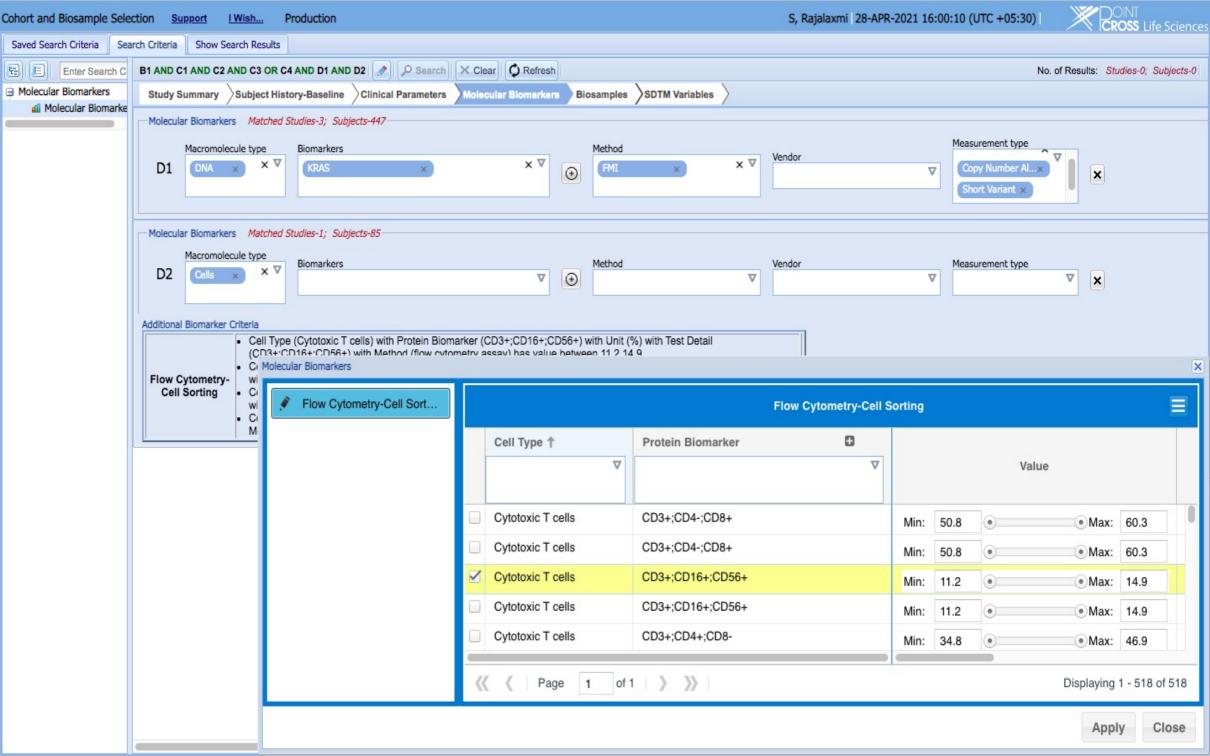
/ ~	Unit Conversion Factors			L Deploy Terminology	Audit Irali Report V Busi	ness Base : PointCross)	(biom Clinical Insights
	©					Search	⊗ () () •
	Parameter	Source Unit	Destination Unit	Conversion Factor	Parameter PCID	Source Unit PCID	Destination Unit PCID
	Glutamate Dehydrogen	IU/L	ukat/L	0.01667	10001602	10000806	10010784
	Glutamate Dehydrogen	IU/L	U/L	1	10001602	10000806	10010750
	Glutathione	mg/dL	mmol/L	0.0325	10001670	10010581	10000790
	Gold	mg/L	umol/L	5.077	10001451	10000724	10025415
	Growth Hormone Inhibi	ng/L	pmol/L	0.611	10001779	10000749	10000744
	Haptoglobin	mg/L	mmol/L	0.00001	10002444	10000724	10000790
	Haptoglobin	mmol/L	g/L	0.01	10002444	10000790	10000825
	Haptoglobin	mmol/L	mg/dL	0.1	10002444	10000790	10010581
s	Haptoglobin	mg/dL	mmol/L	10	10002444	10010581	10000790
	HDL Cholesterol	mg/dL	mmol/L	0.0259	10002300	10010581	10000790
	HDL Cholesterol	g/L	mmol/L	2.59	10002300	10000825	10000790
	HDL Cholesterol	mmol/L	mg/dL	38.61	10002300	10000790	10010581
	HDL-Cholesterol Subcl	mg/dL	mmol/L	0.0259	10001450	10010581	10000790
	HDL-Cholesterol Subcl	mg/dL	mmol/L	0.0259	10001449	10010581	10000790
	Height	in	m	0.0254	10001270	10001249	10010556
	Hematocrit	mL/dL	%	1	10002226	10010609	10000711
	Hematocrit	v/v	%	100	10002226	10025005	10000711
	Hemoglobin	g/dL	mmol/L	0.155	10002627	10010476	10000790
	Hemoglobin	g/L	mmol/L	0.0155	10002627	10000825	10000790
	Hemoglobin	mmol/L	g/L	64.52	10002627	10000790	10000825
	Hemoglobin	mmol/L	g/dL	6.45	10002627	10000790	10010476
	Hexokinase	U/10^12 Erc	ukat/10^12 Erc	0.0167	10001882	10025865	10025866
	Histamine	ug/L	nmol/L	8.997	10001448	10000774	10000761
	Homocysteine	mg/L	umol/L	7.397	10002443	10000724	10025415

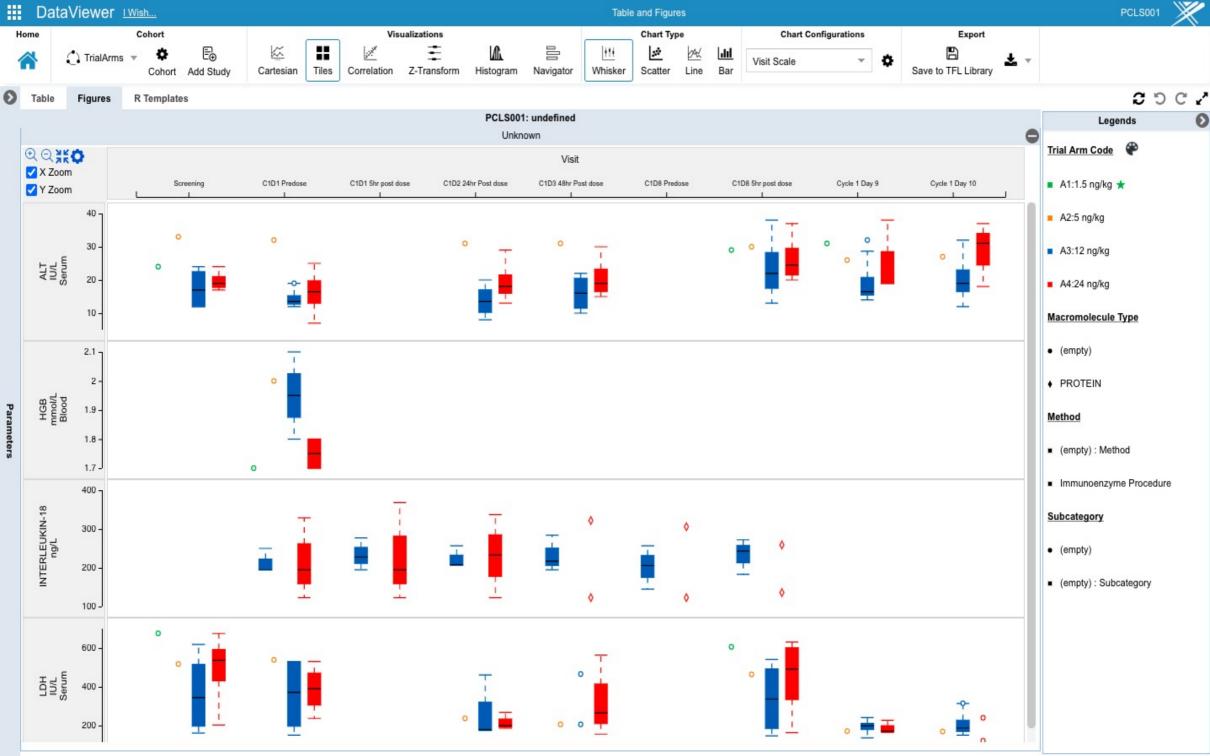




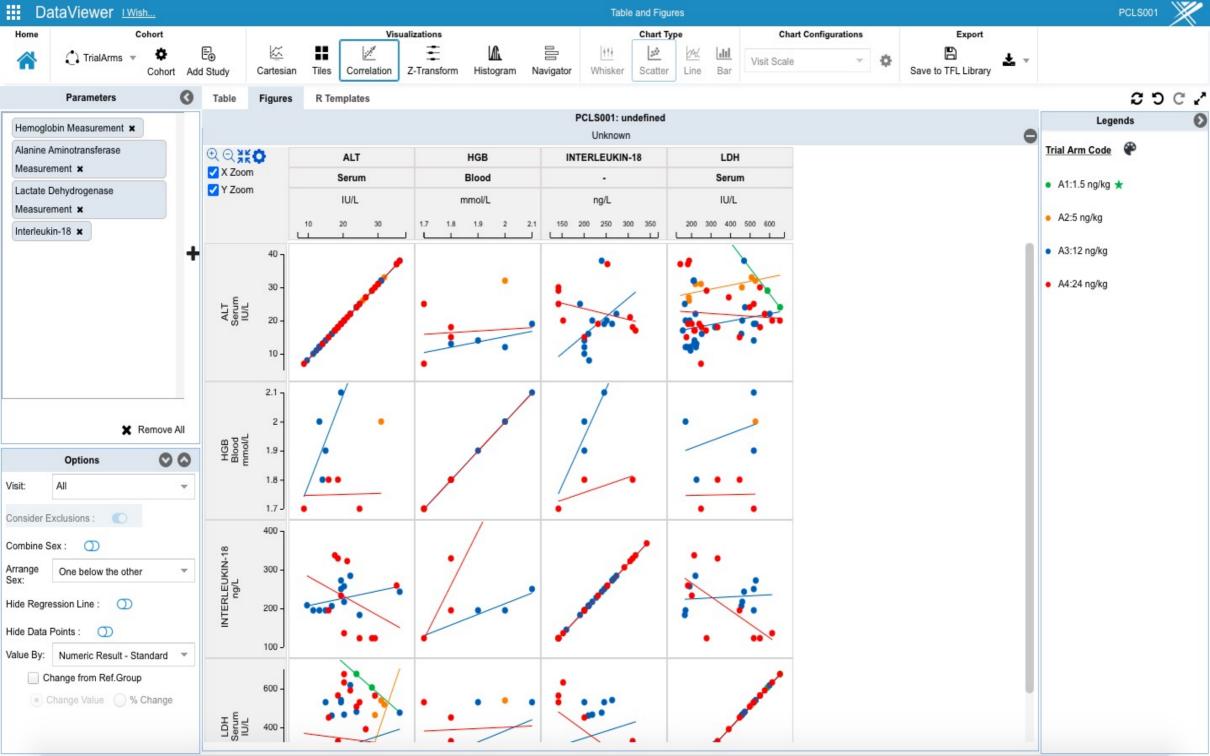
Da	ataset Level	Variable Level	Value Level N	Metadata				
Œ	Add	Edit Delete	C Refresh	Save Undo				T * (
	~	Order Number 🔻	Domain* -	Section	Variable Name*	Variable Label*	Data Type 🔻	Select Types
	ව	1	Program	General	studyNumber	Study	Text	Multi
	ව	1	Study List	General	TestArticle	Test Article	Text	Single
	b	2	Study List	General	DrugType	Drug Type	Text	Single
	ව	3	Study List	General	Antibody	Antibody	Text	Single
	ව	4	Study List	General	StudyList_DrugLinker	Drug Linker	Text	Single
	' D	5	Study List	General	ReleasedDrug	Released Drug	Text	Single
	ව	6	Study List	General	StudyType	Study Type	Text	Single
	ව	7	Study List	General	StudyCategory	Study Category	Text	Single
	ව	8	Study List	General	Species	Species	Text	Single
	ව	9	Study List	General	GLPvsnonGLP	QA Type	Text	Single
	ව	1	Target	General	targetOnBoneMrrwProgram	Target on BoneMarrow	Text	Single
	ව	2	Target	General	General_Other	Other	Text	
	ව	1	Test Article	ADC	mAbBackbone	Antibody	Text	Multi
	ව	2	Test Article	ADC	DAR	DAR	Integer	
	ව	3	Test Article	ADC	ADC_drugLinker	Drug Linker	Text	Multi
1	ව	4	Test Article	ADC	PayloadReleasedDrug	Released Drug	Text	Multi
	ව	1	Test Article	Drug Linker	ADCstability	ADC stability	Text	Single
	න	2	Test Article	Drug Linker	reactivehandle	Reactive handle	Text	
	ව	3	Test Article	Drug Linker	CleavageSite	Cleavage Site	Text	Single
	ව	4	Test Article	Drug Linker	DrugLinker_Other	Other	Text	
1	ව	1	Test Article	General	Testarticletype	Drug Type	Text	Single
	9	2	Test Article	General	Program	Program	Text	
	ව	3	Test Article	General	CASNUMBER	CAS NUMBER	Text	
	න	4	Test Article	General	drugClass	Compound Class	Text	Single

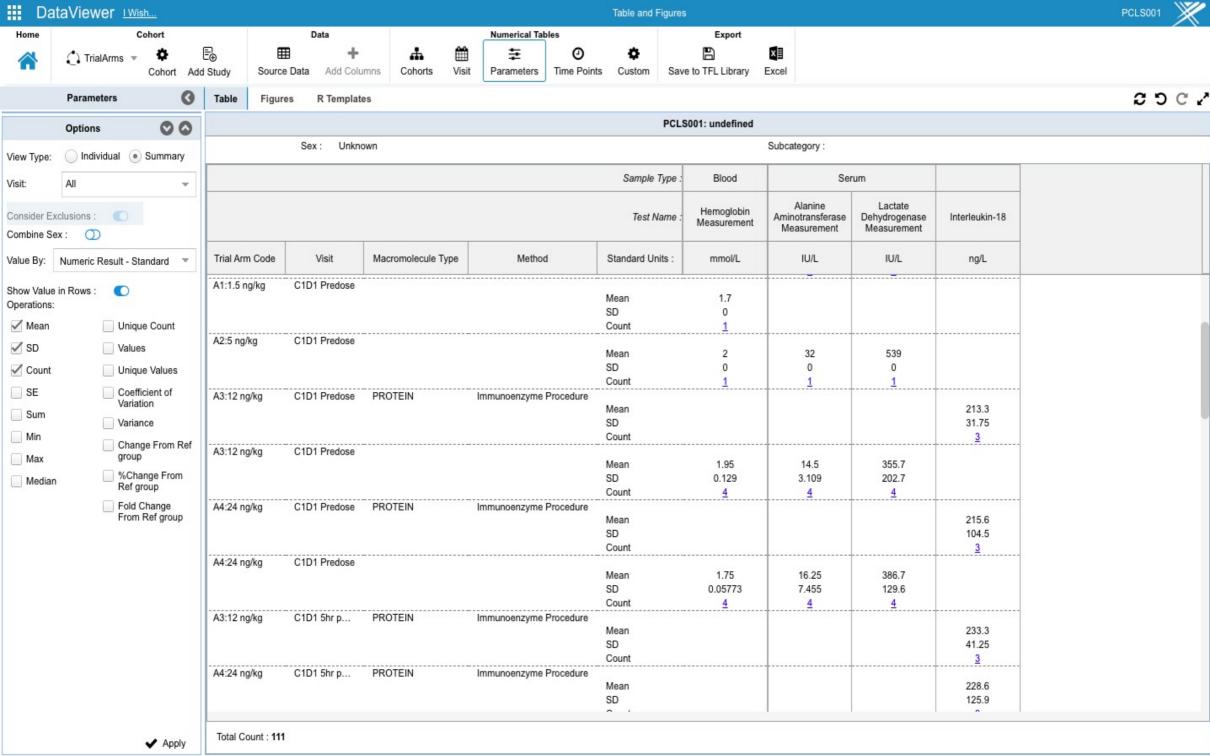


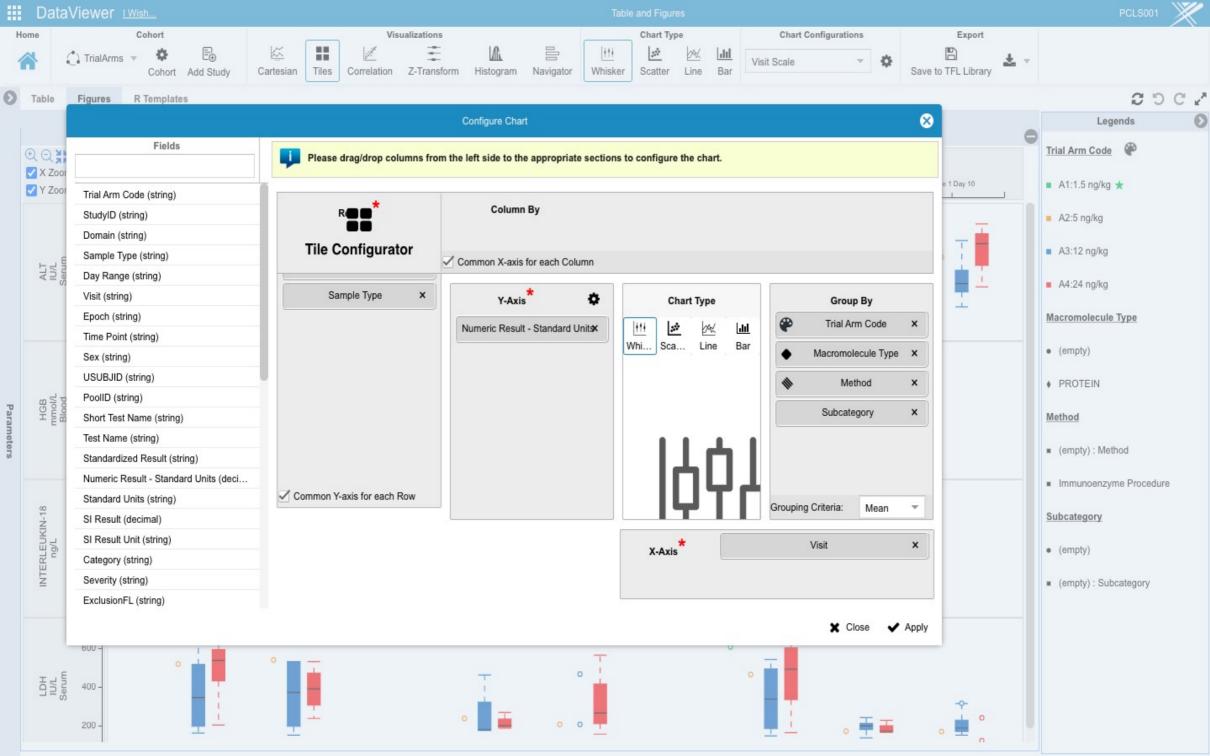


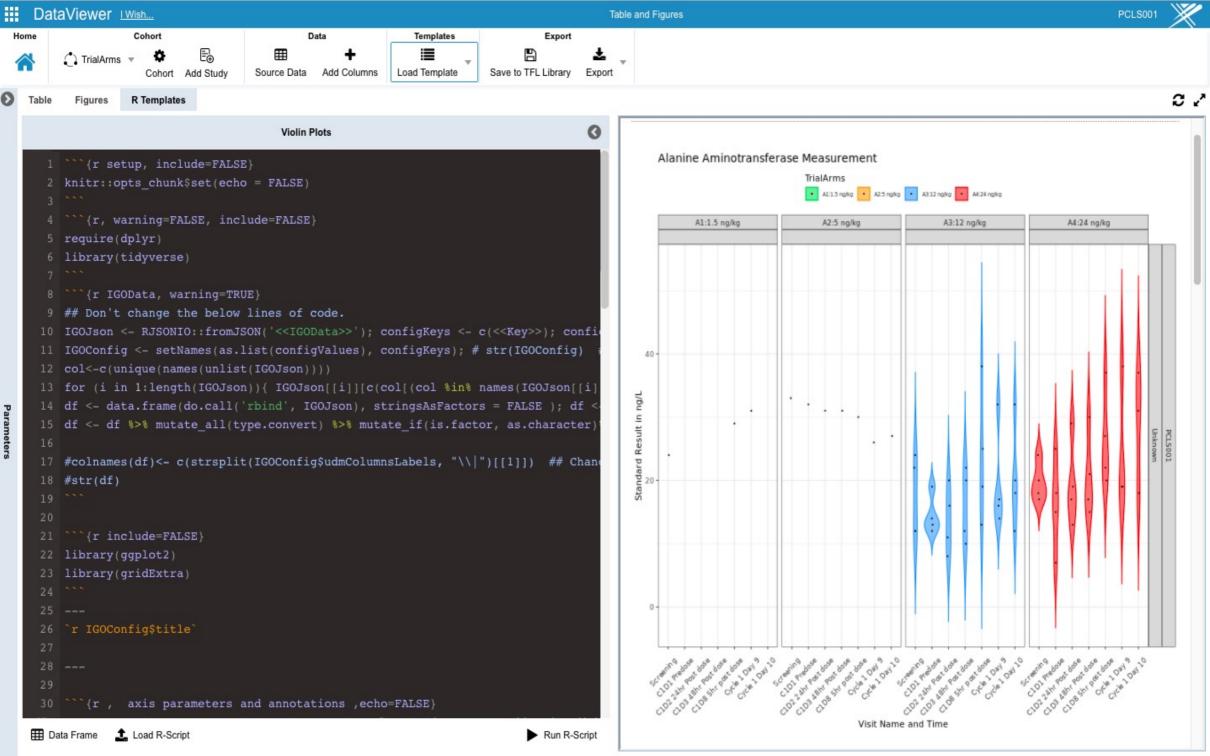


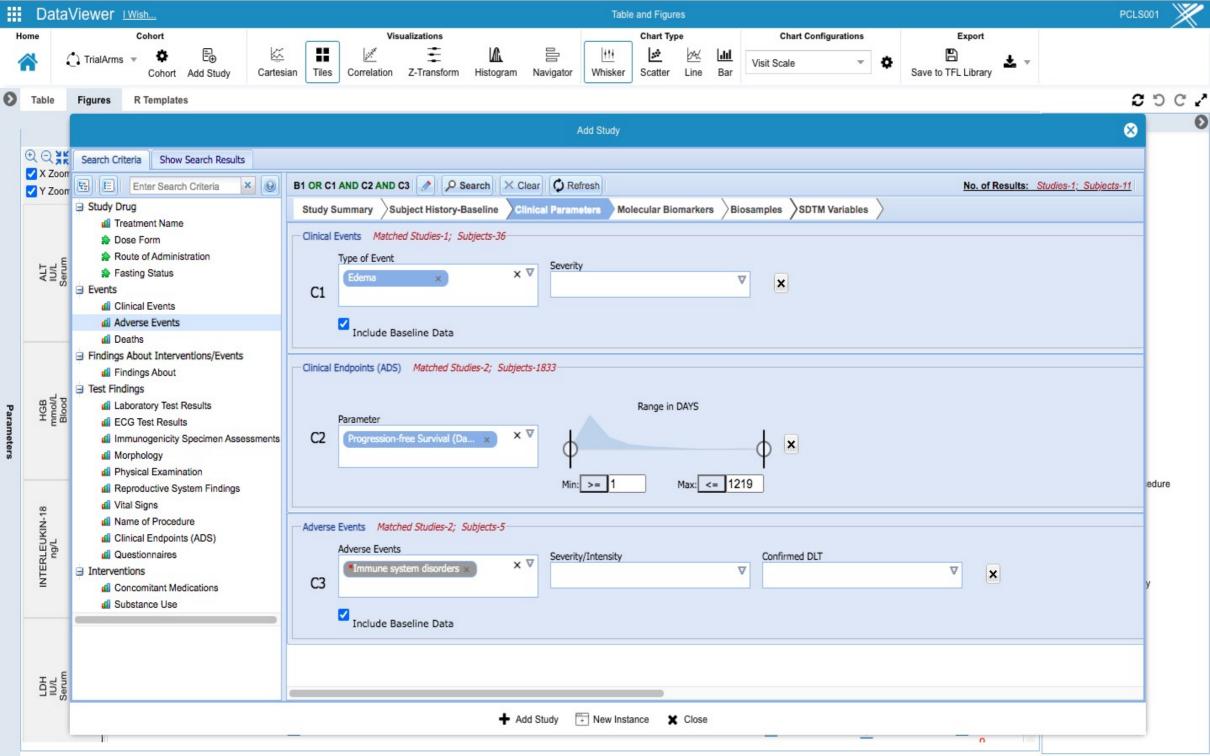


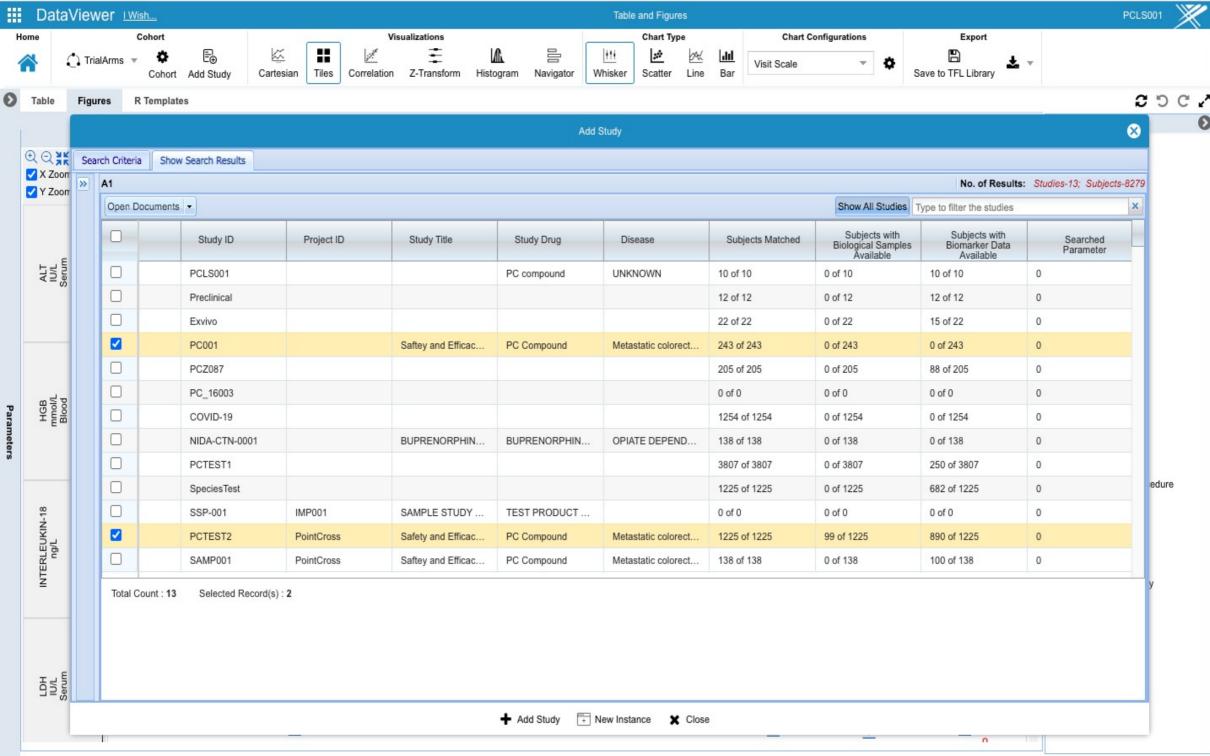


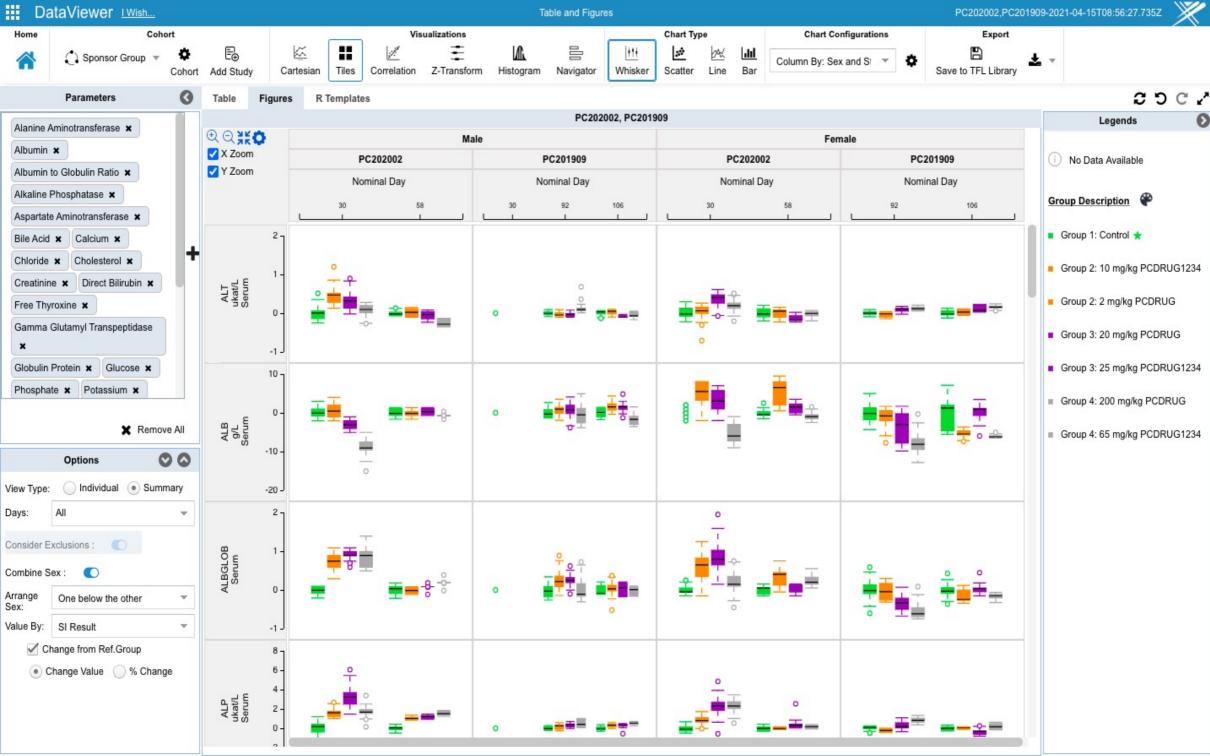


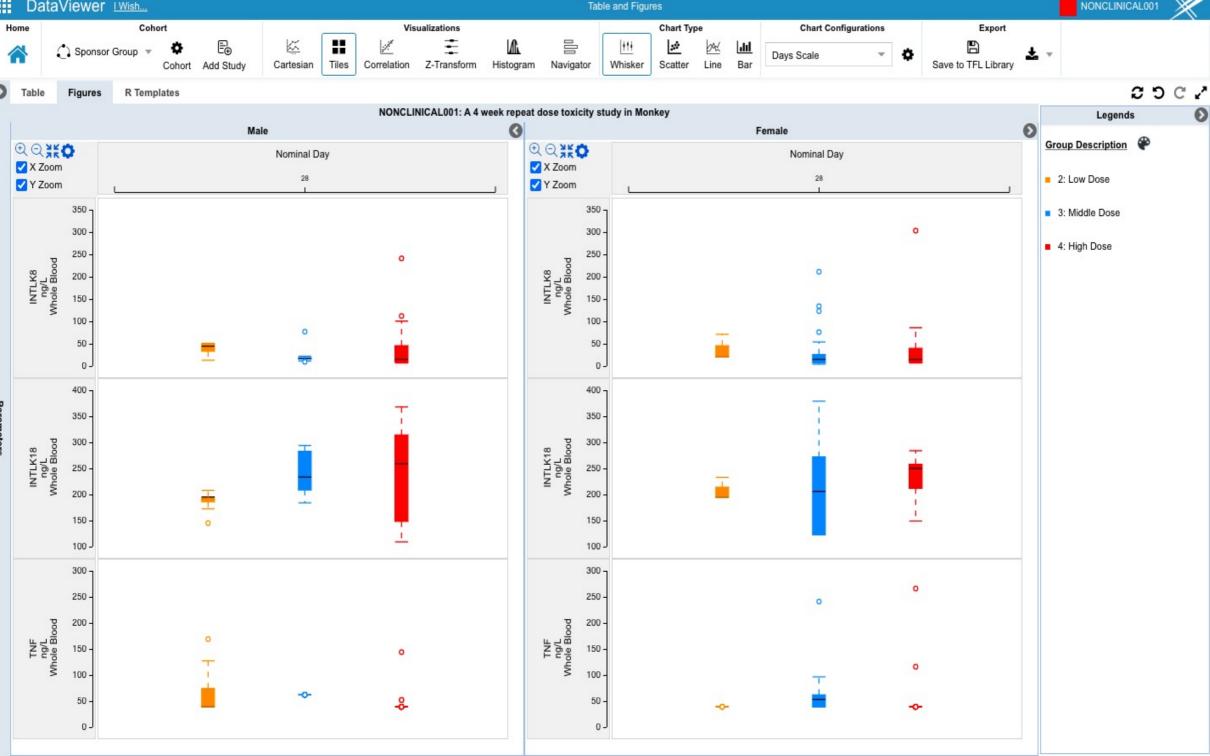


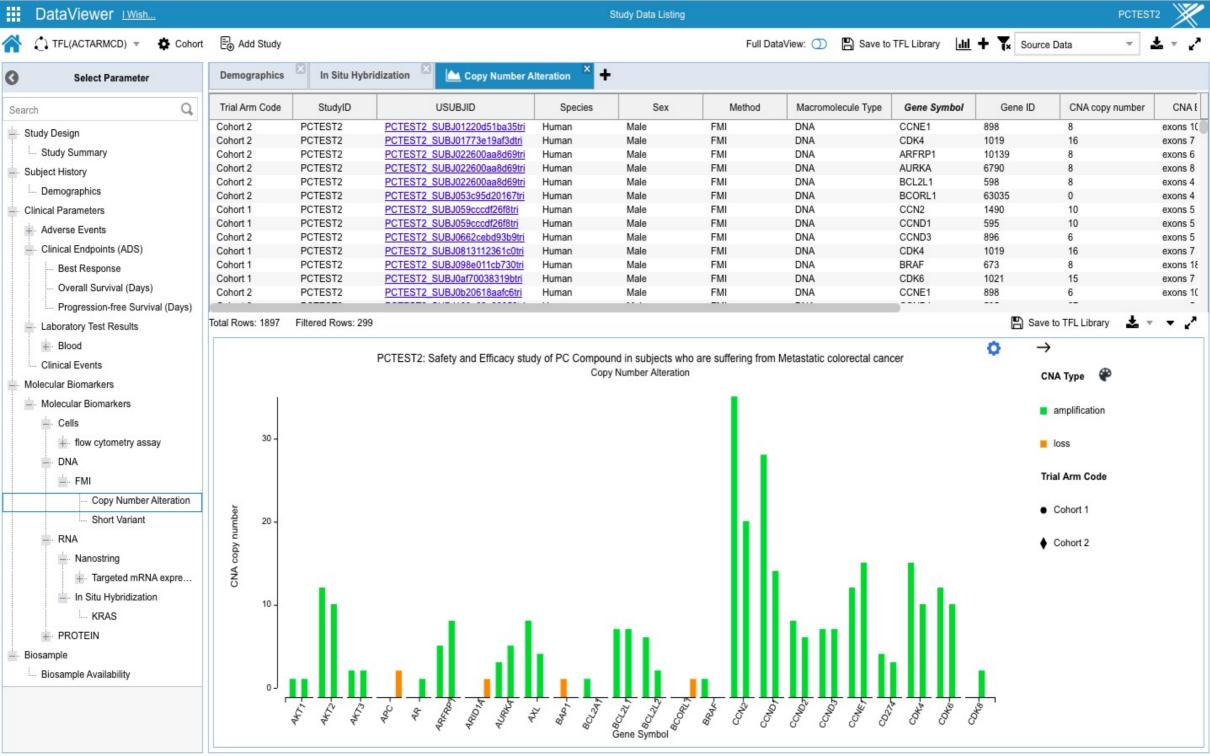


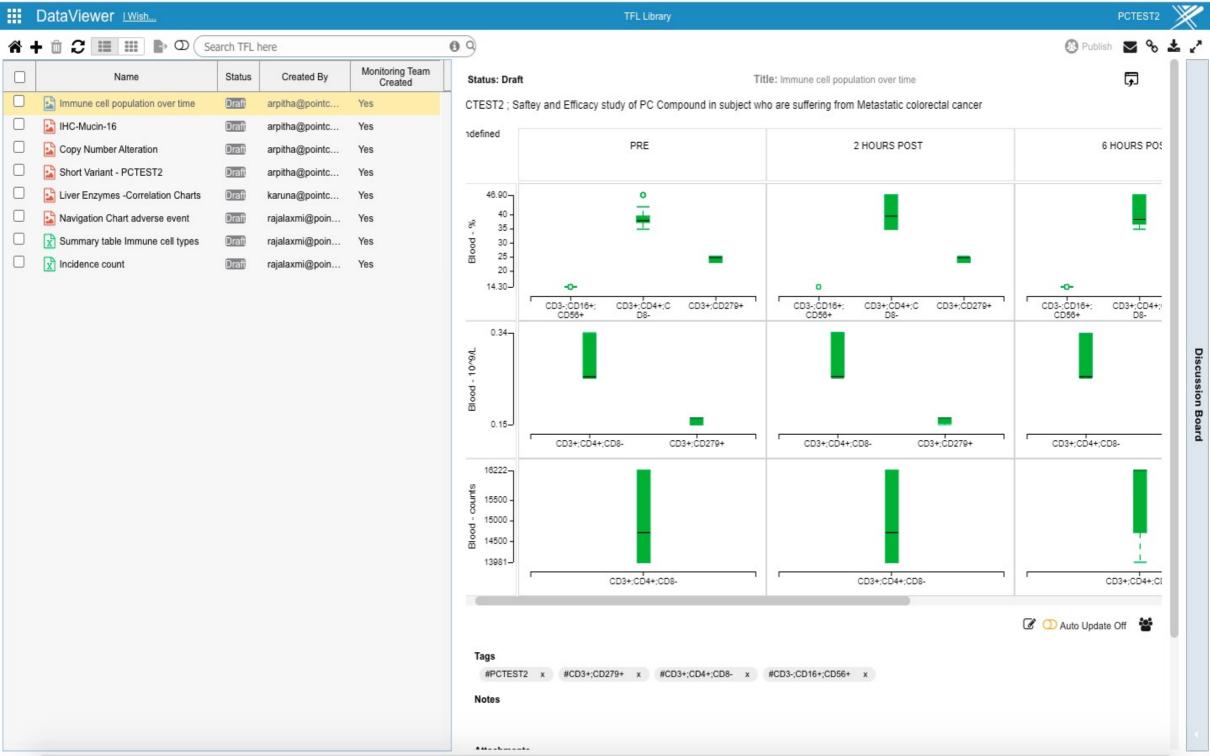


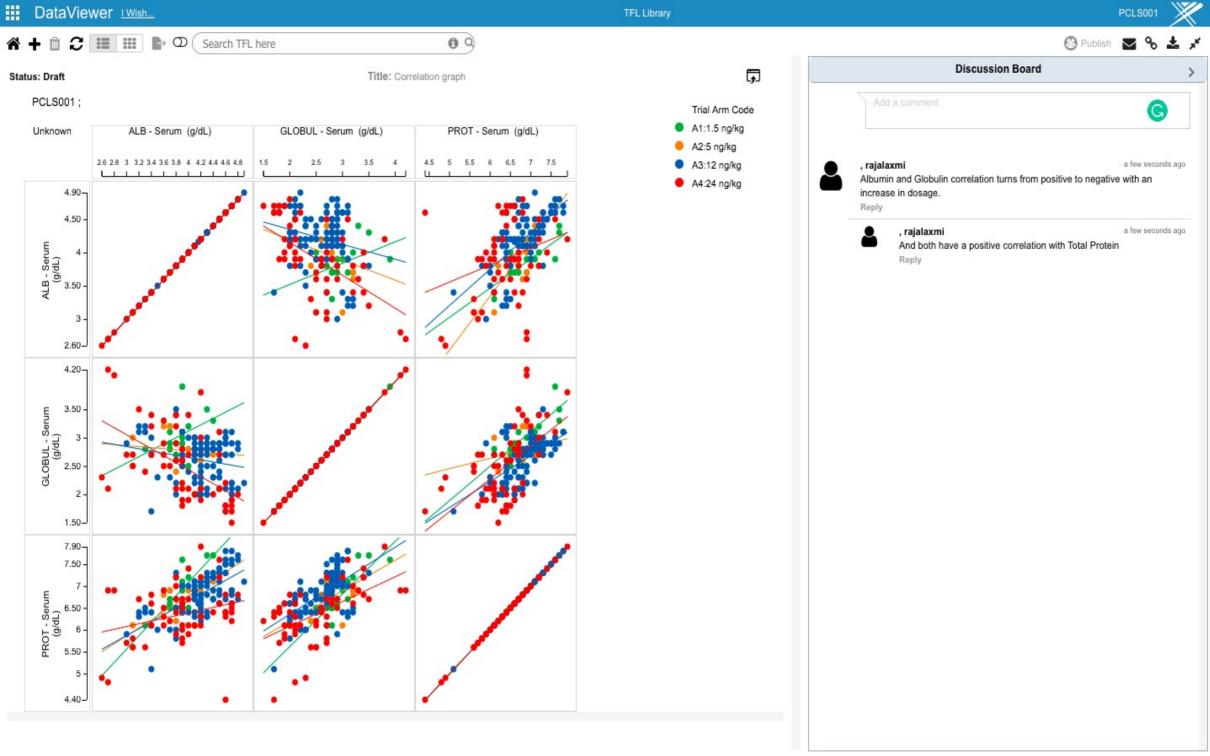


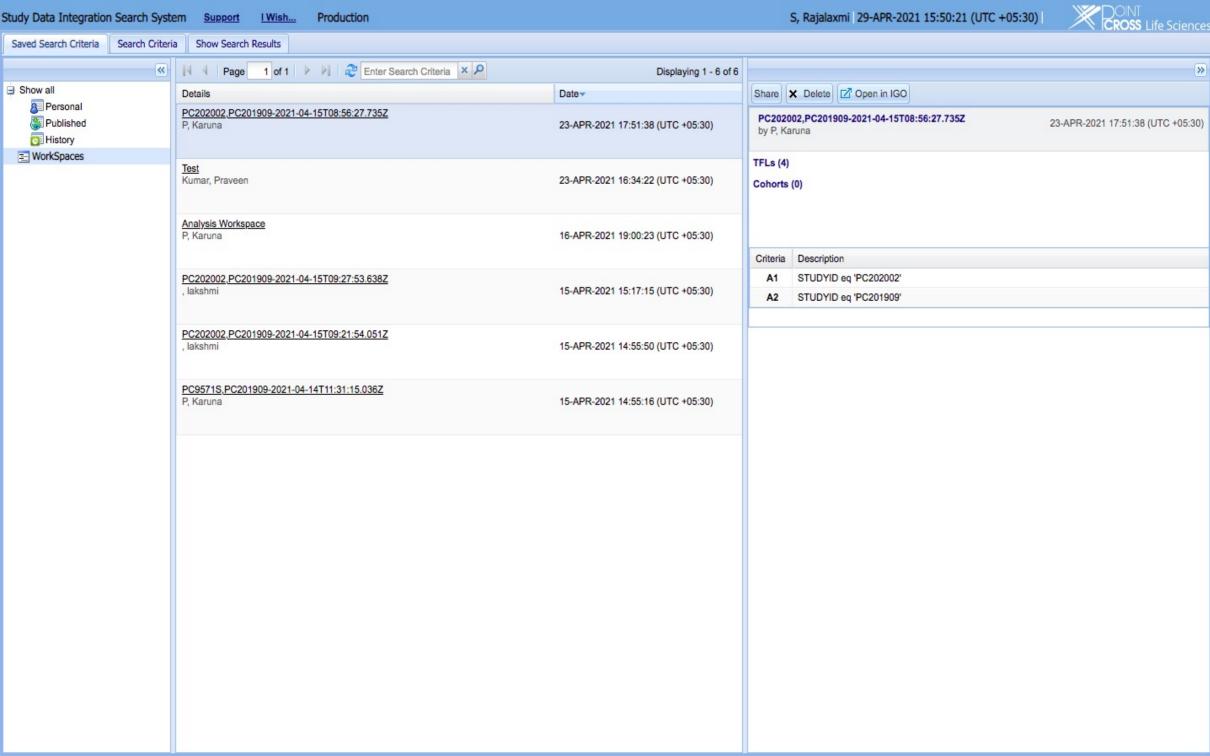


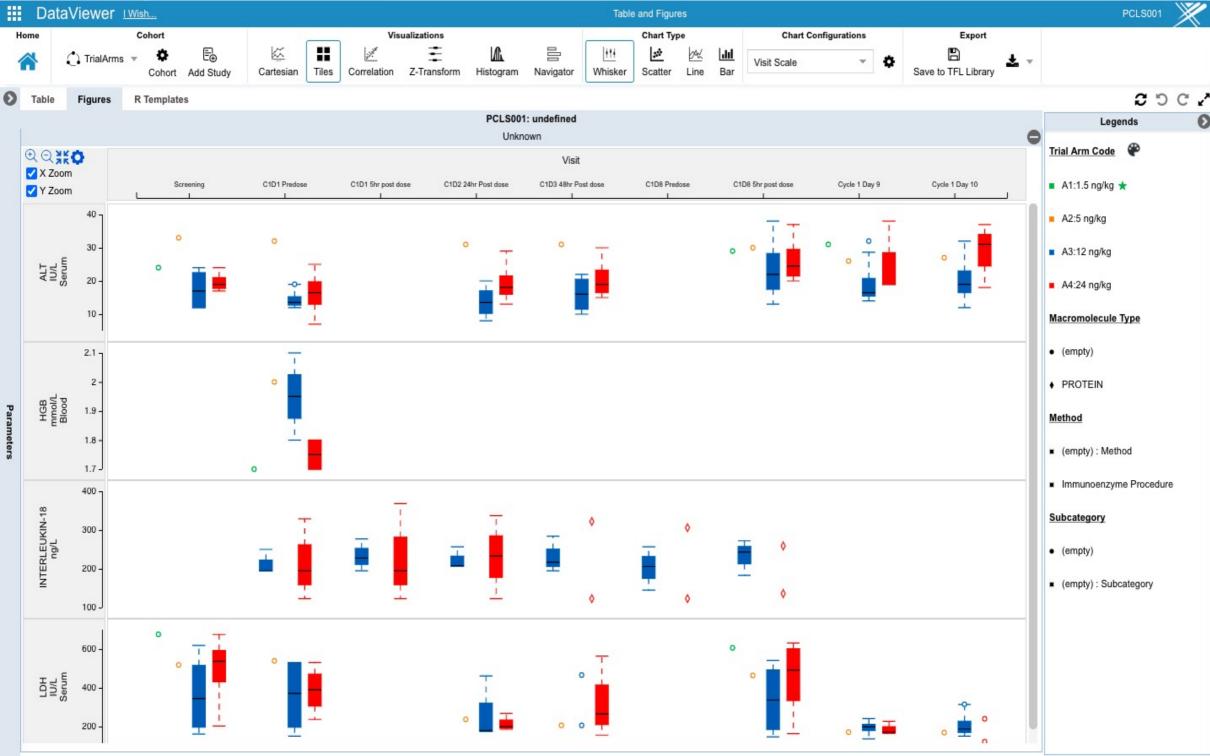


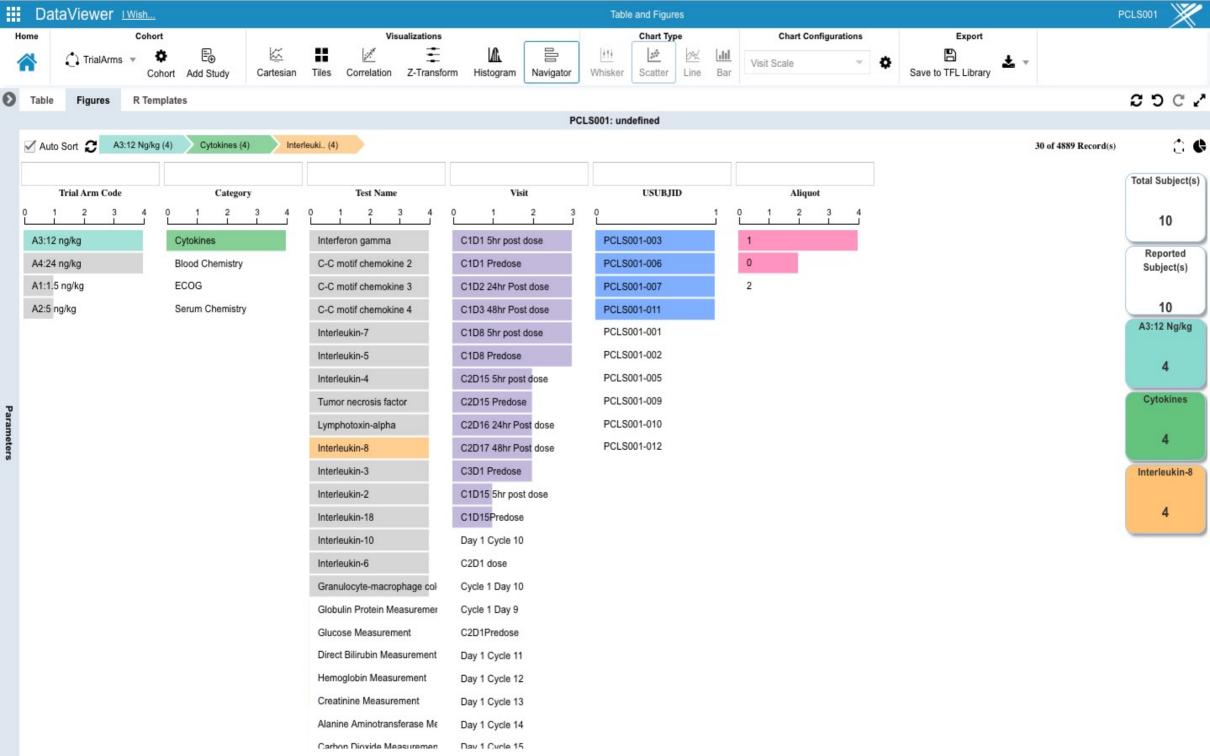
















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Question & Answers

Please direct questions to the Host via the Chat function

www.pointcrosslifesciences.com

Webinar on Xbiom[™]

Enabling Data Integration for Translational & Precision Medicine





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Thank You for your participation

www.pointcrosslifesciences.com

Let's Talk!

Data Concierge Service & Xbiom Clinical Insights & Translational Workbench Schedule a consultation at get_started@pointcross.com