

# OmicSoft Land Explorer

Making disease-relevant data accessible to biologists



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# Identification of a prognostic RNA-Seq expression signature in endometrial carcinoma

## Diagnostic Oncology

Research

## Identification of a prognostic RNA-Seq expression signature in endometrial carcinoma

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## Abstract

Select land TCGA\_B38
Find gene 

Menu

✓ Apply

Search...

**Collections**

Check All Check None Invert

Body Map

Cell Line

DiseaseLand

OncoLand

-missing-

**GenomeBuild**

Check All Check None Invert

Human\_B37

Human\_B38

Mouse\_B38

Rat\_B6

-missing-

**Data Type**

Check All Check None Invert

Array

### Tissue Distribution

Tissue Category	Sample Counts
breast	100,000+
gastrointestinal system	~80,000
liver	~60,000
connective tissue	~50,000
gland	~40,000
blood vessel	~30,000
Lung	~20,000
Prostate	~15,000
Large Intestine - Colon	~10,000
Pancreas	~8,000
Urinary Tract - Bladder	~6,000
Skin	~5,000
Bone	~4,000
Thyroid	~3,000
Large Intestine - Rectum	~2,000
Embryonic Tissue	~1,000
anatomical cavity	~1,000
artificial tissue	~1,000
Soft Tissue - Muscle	~1,000
Uvea	~1,000
Thymus	~1,000
mesentery	~1,000
Autonomic Ganglia	~1,000
Vulva	~1,000
Placenta	~1,000
Testis	~1,000
Soft Tissue - Adipose Tissu...	~1,000
TESTICLE	~1,000

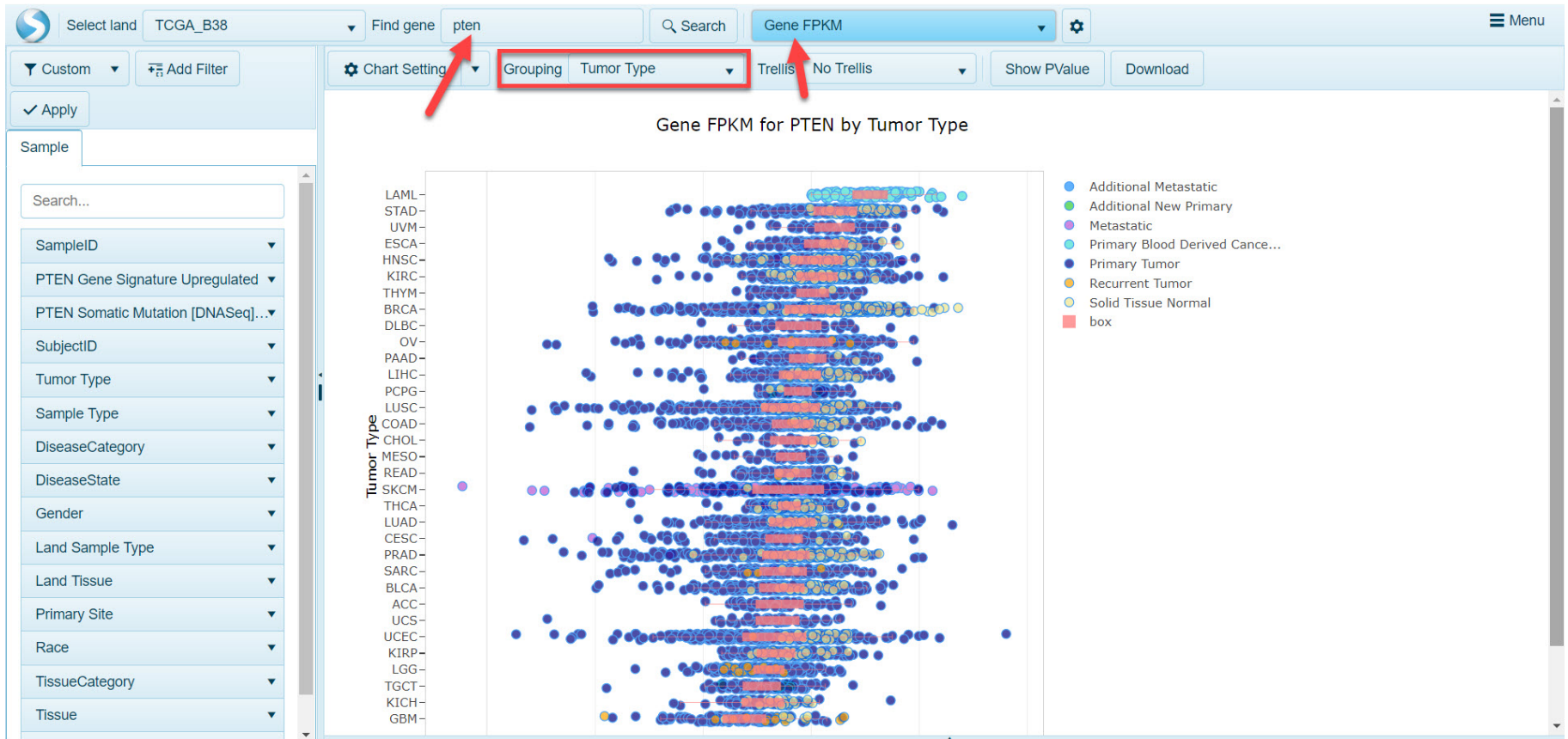
Sample Counts

Land Name	RNA-Seq	CNV	Array	DNA-Seq	Protein
TARGET_B37	1435	1850	1304	483	0
TARGET_B38	1435	0	1304	483	0
TCGA_B37	11291	22300	2377	10227	7930
TCGA_B38	11291	22242	0	10189	7929
TumorMuta...	0	15390	156	20002	0
<b>Others</b>					
MET500_B38	443	500	0	500	0

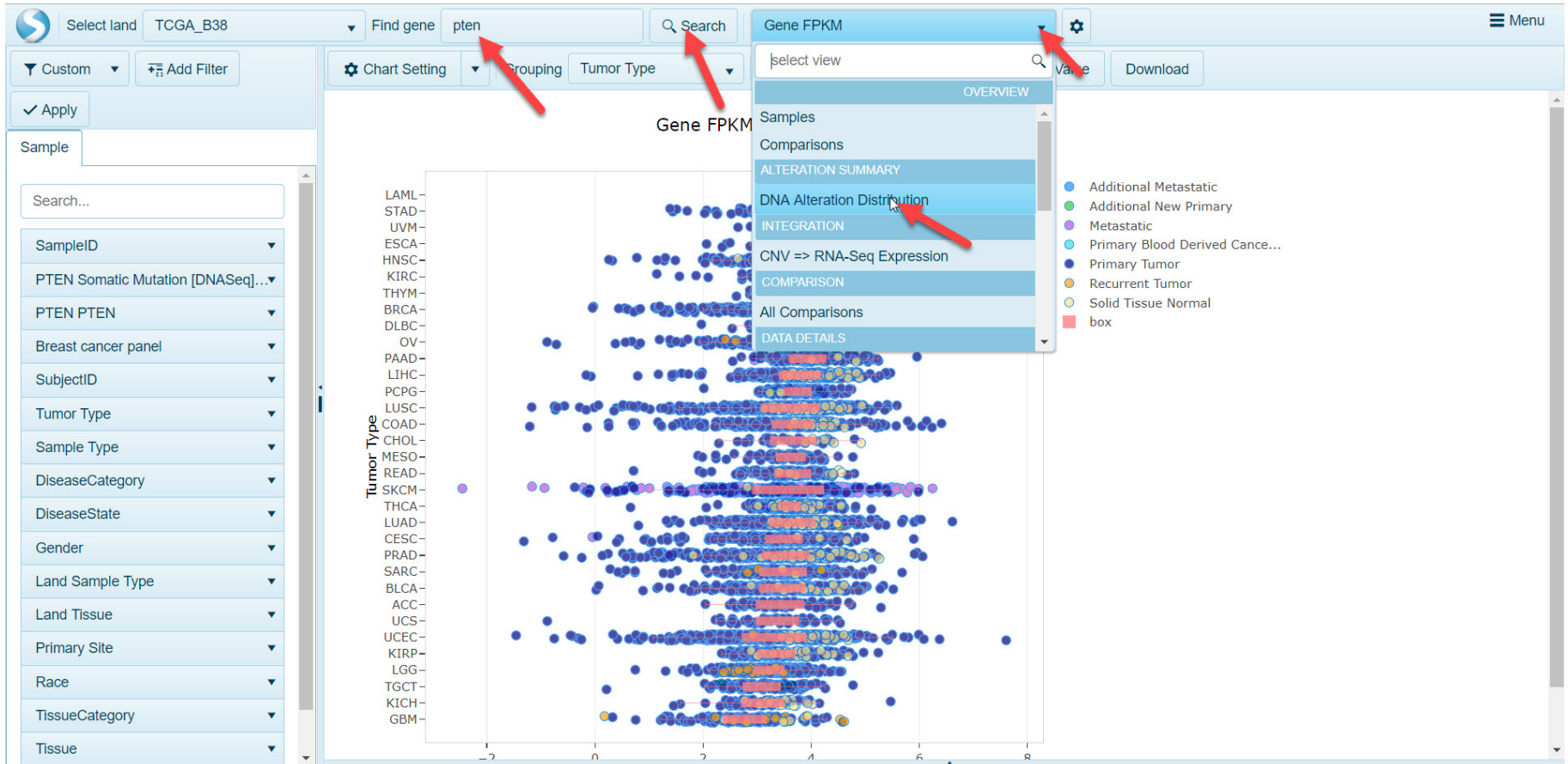
  

Collections: OncoLand  
 Land Name: TCGA\_B38  
 Sample #: 51651

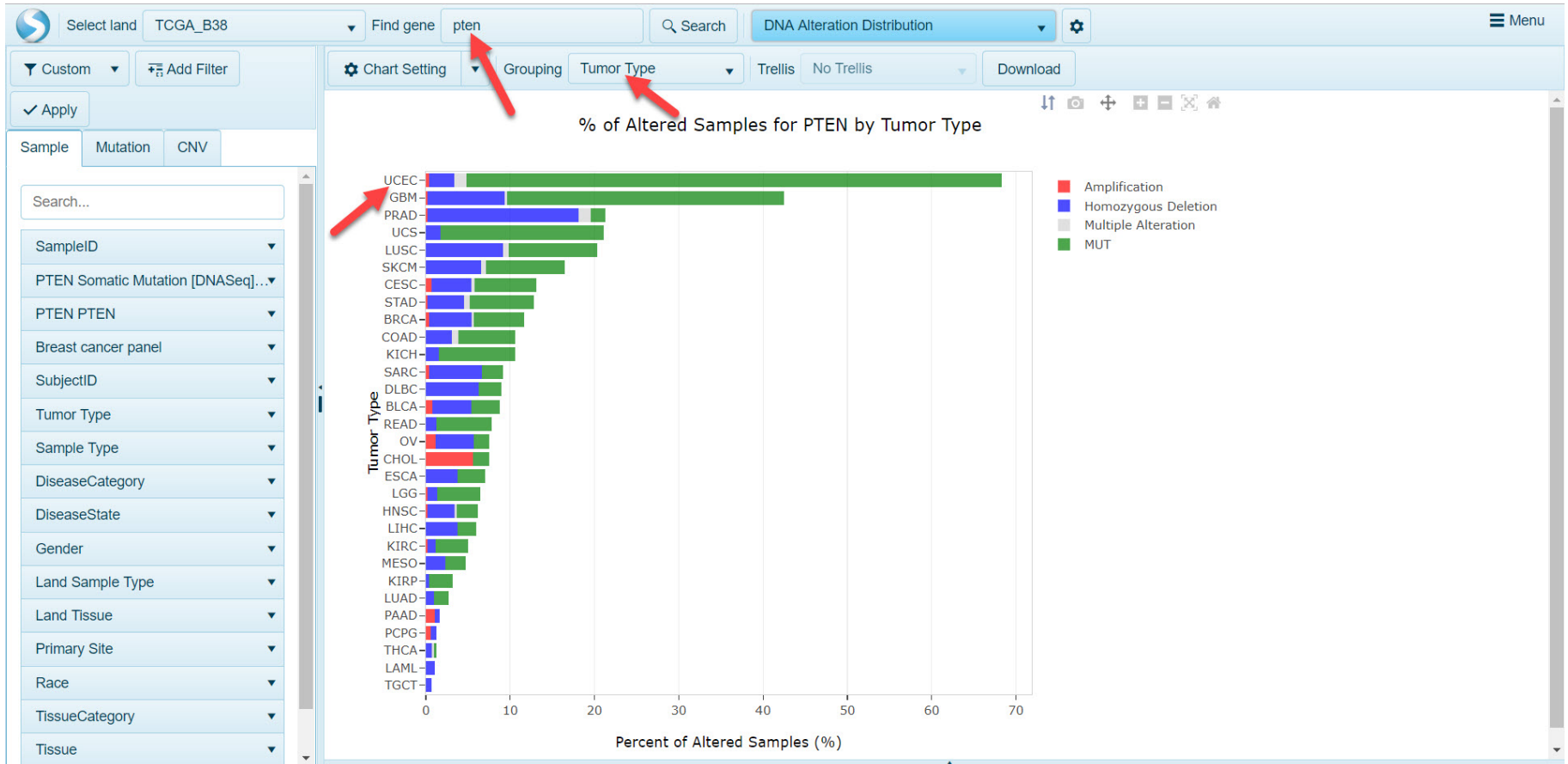
■ Body Map 
 ■ Cell Line 
 ■ OncoLand 
 ■ DiseaseLand 
 ■ Others



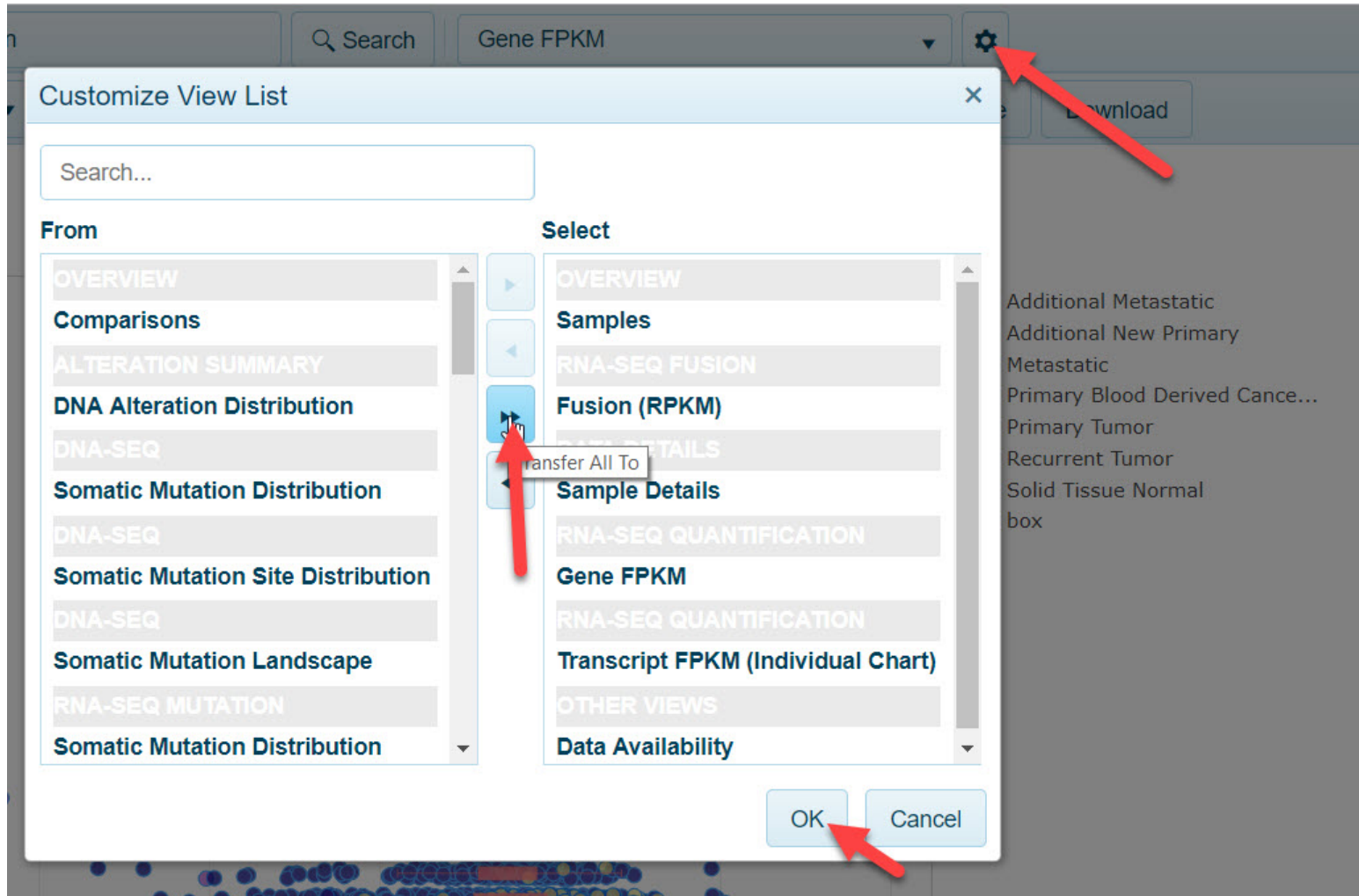
# Switch to DNA Alteration Distribution view to see DNA-Seq data



# PTEN has the highest mutation rate in UCEC tumors



# Navigate to full visualizations menu



### Customize View List ✕

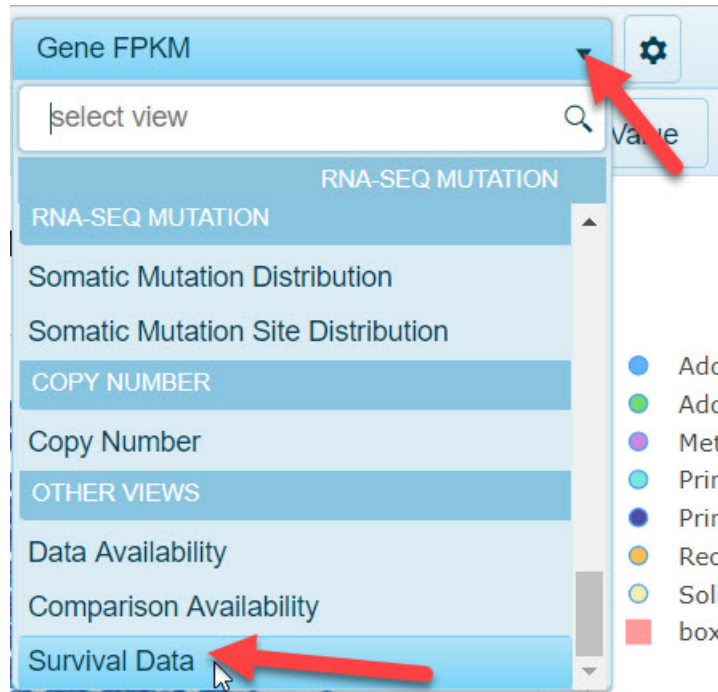
Other data types and views available:

From		Select
DNA-SEQ <span style="color: red; font-weight: bold;">DNA-Seq</span>	▶	OVERVIEW
Somatic Mutation Site Distribution	◀	Samples
DNA-SEQ	▶▶	OVERVIEW
Somatic Mutation Landscape	◀◀	Comparisons
RNA-SEQ MUTATION		ALTERATION SUMMARY
Somatic Mutation Distribution		DNA Alteration Distribution
RNA-SEQ MUTATION		DNA-SEQ
Somatic Mutation Site Distribution		Somatic Mutation Distribution
RNA-SEQ FUSION <span style="color: red; font-weight: bold;">RNA-Seq</span>		RNA-SEQ FUSION
Fusion (Site Frequency)		Fusion (RPKM)
RNA-SEQ FUSION		INTEGRATION
Fusion (GenePair Frequency)		CNV => RNA-Seq Expression

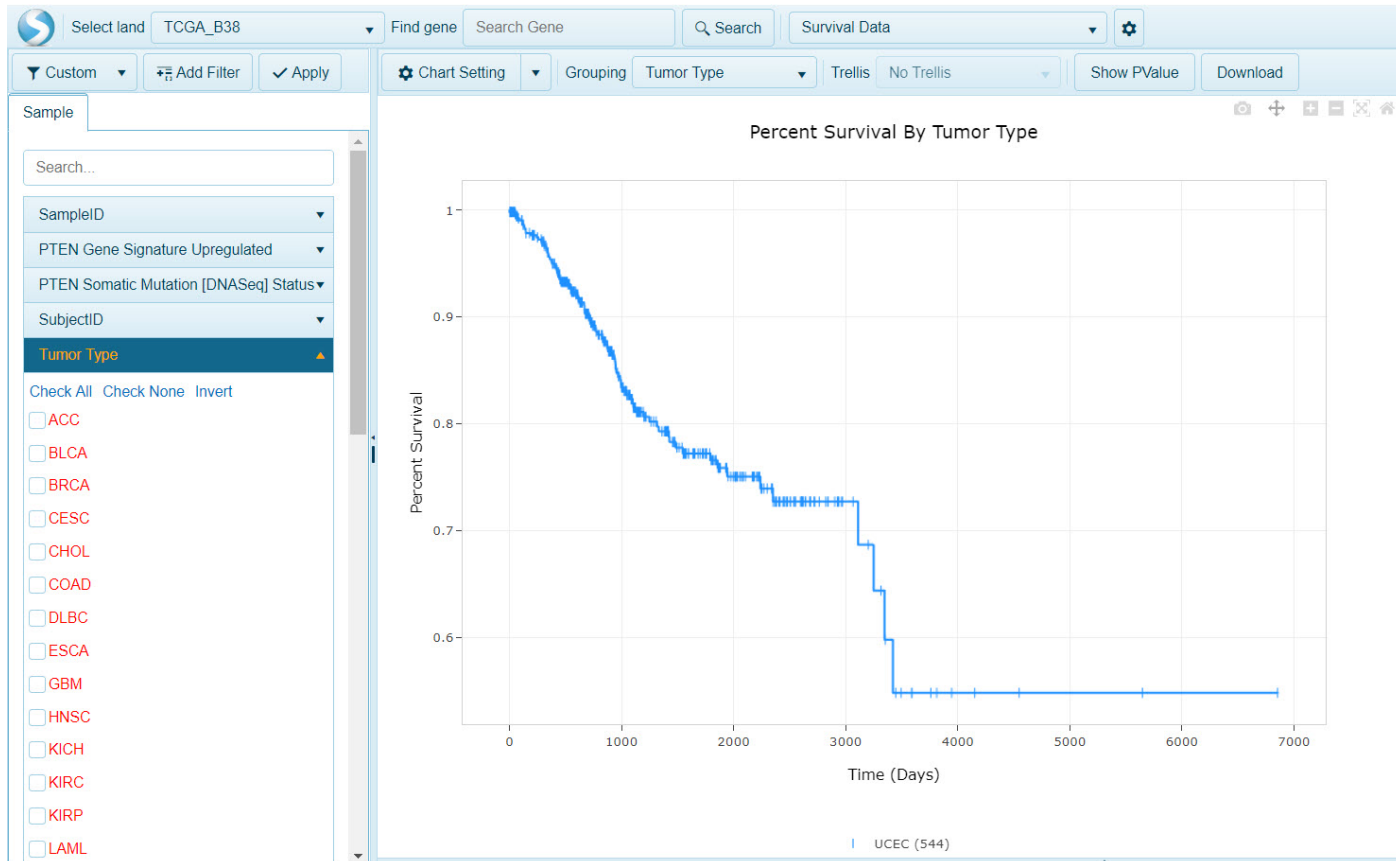
miRNA-Seq  
 Methylation  
 Protein (RPPA) data

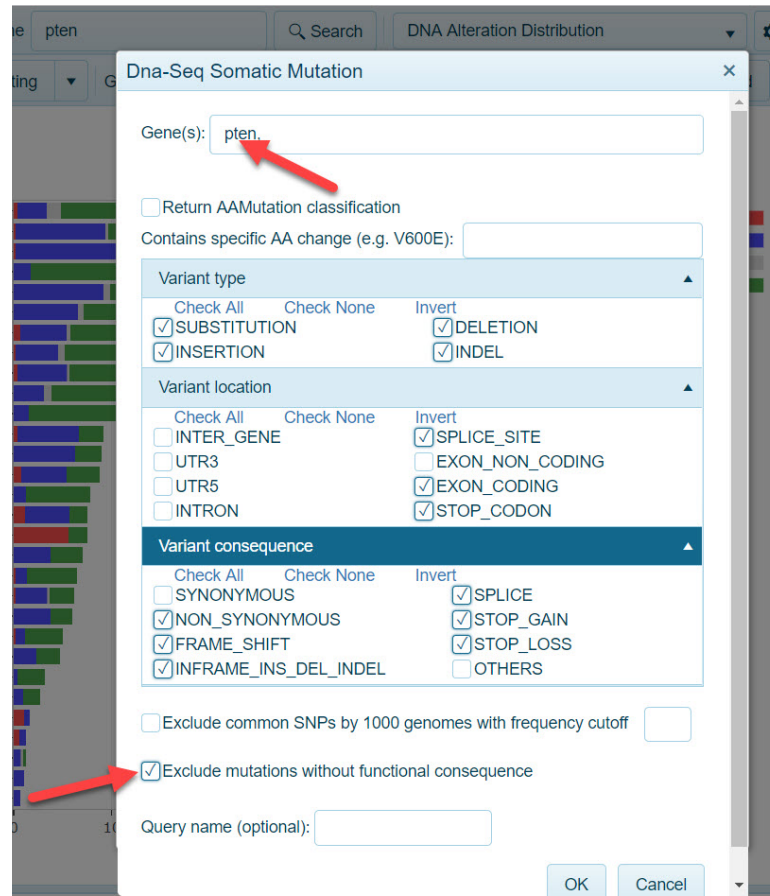


# Switch to Survival Data view



# Survival plot of all UCEC patients





Gene(s):

Return AAMutation classification

Contains specific AA change (e.g. V600E):

**Variant type**

Check All    Check None    Invert

SUBSTITUTION     DELETION

INSERTION     INDEL

**Variant location**

Check All    Check None    Invert

INTER\_GENE     SPLICE\_SITE

UTR3     EXON\_NON\_CODING

UTR5     EXON\_CODING

INTRON     STOP\_CODON

**Variant consequence**

Check All    Check None    Invert

SYNONYMOUS     SPLICE

NON\_SYNONYMOUS     STOP\_GAIN

FRAME\_SHIFT     STOP\_LOSS

INFRAME\_INS\_DEL\_INDEL     OTHERS

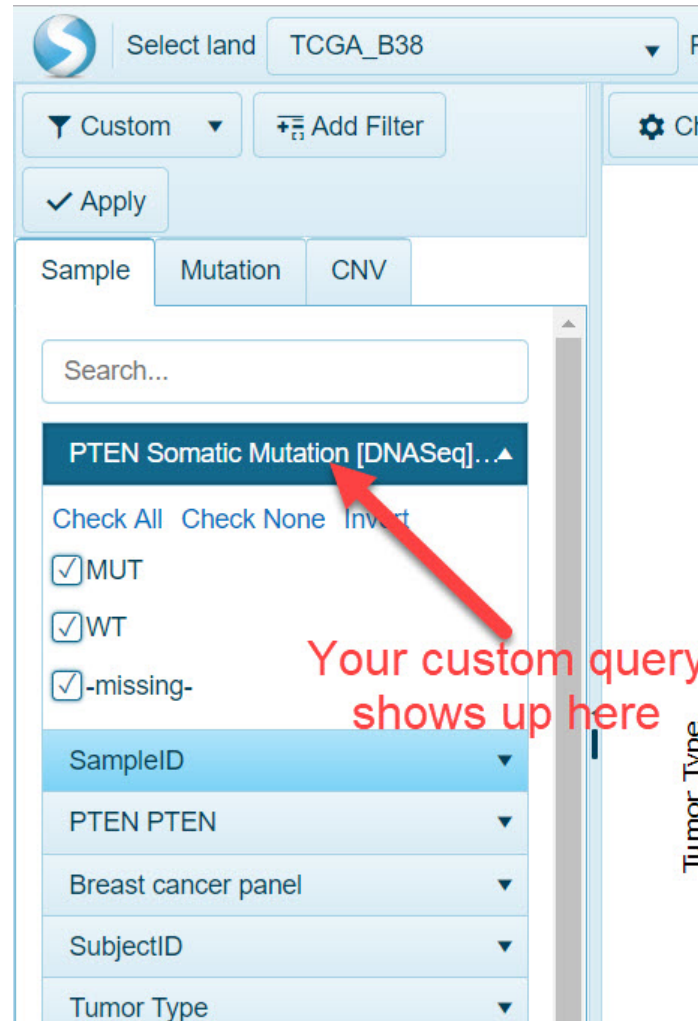
Exclude common SNPs by 1000 genomes with frequency cutoff

Exclude mutations without functional consequence

Query name (optional):

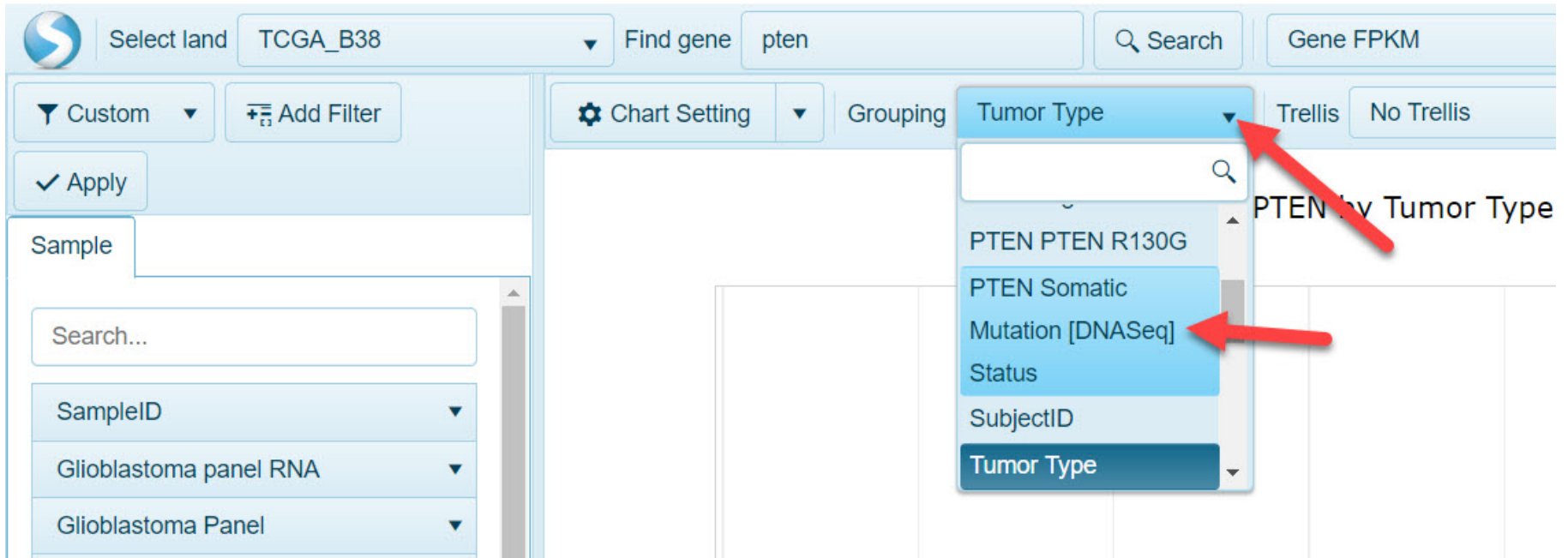
OK    Cancel

# The custom query becomes one of the dynamic filters

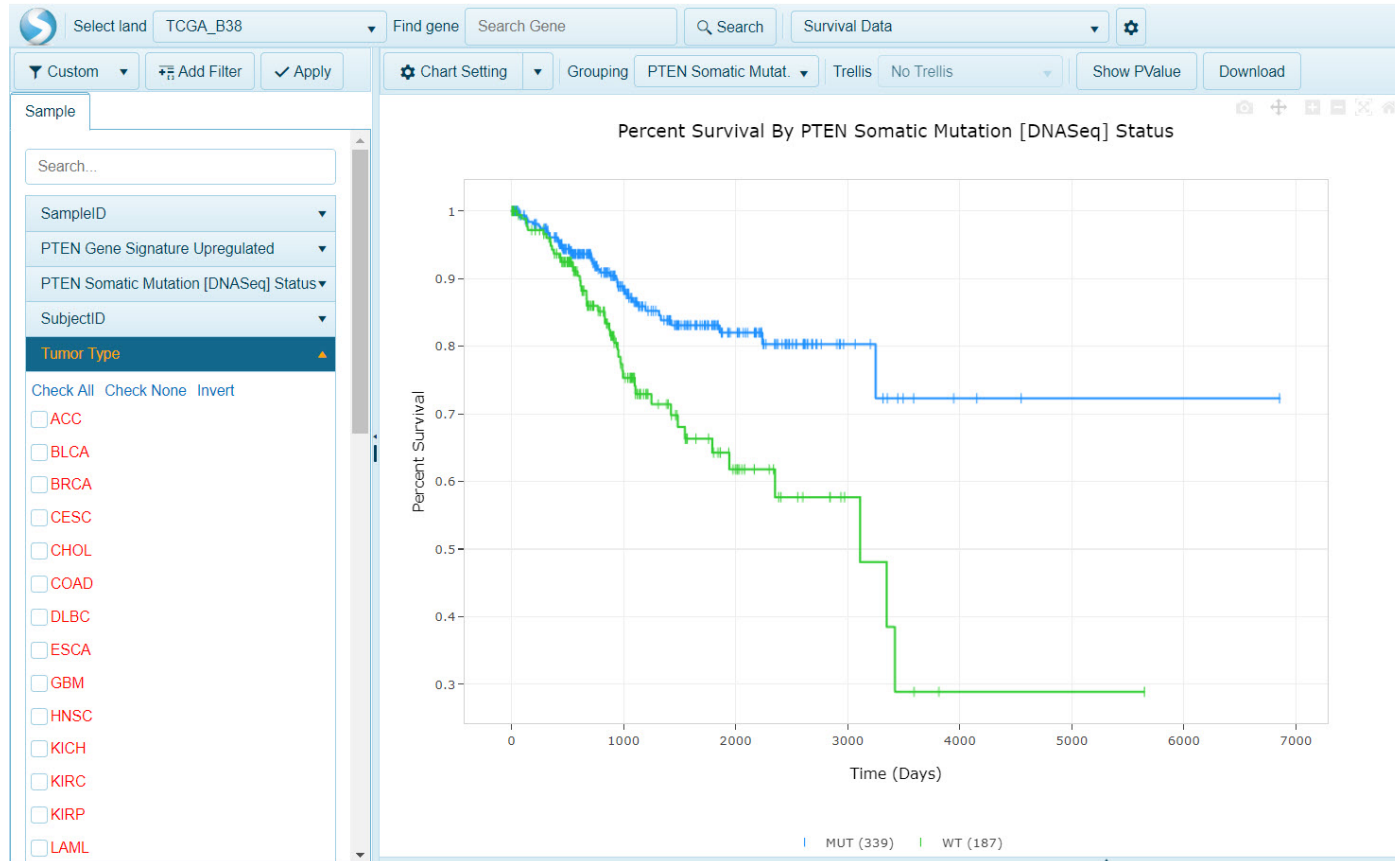


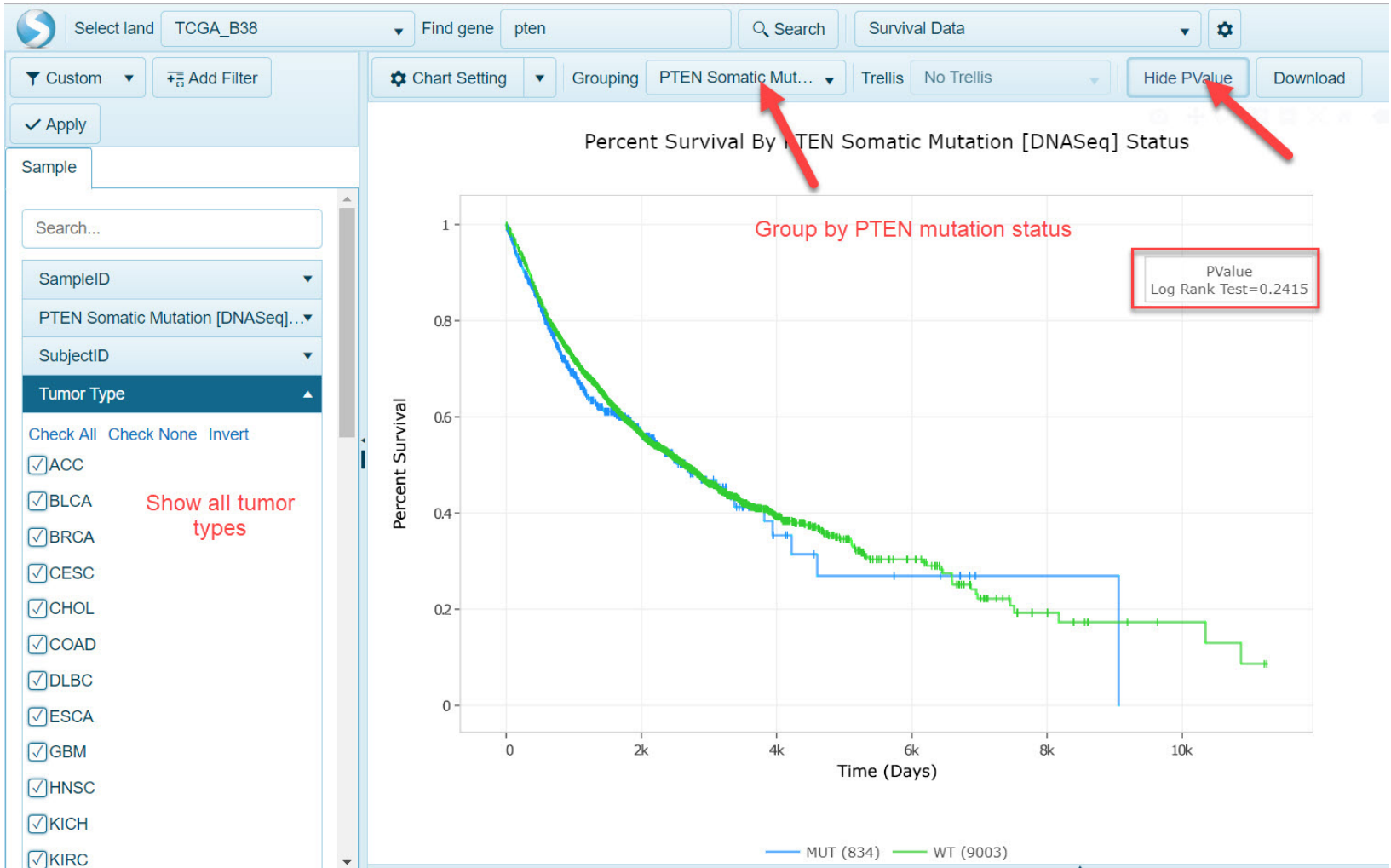
The screenshot shows a software interface for data analysis. At the top, there is a 'Select land' dropdown menu set to 'TCGA\_B38'. Below this, there are buttons for 'Custom', 'Add Filter', and 'Apply'. The main area has three tabs: 'Sample', 'Mutation', and 'CNV'. A search bar is present, and a filter menu is open, showing 'PTEN Somatic Mutation [DNaseq]...' highlighted in dark blue. A red arrow points to this filter, with the text 'Your custom query shows up here' written in red. Below the filter, there are options to 'Check All', 'Check None', and 'Invert'. There are also three checked checkboxes: 'MUT', 'WT', and '-missing-'. At the bottom, there are several dropdown menus: 'SampleID', 'PTEN PTEN', 'Breast cancer panel', 'SubjectID', and 'Tumor Type'. The text 'Tumor Type' is also written vertically on the right side of the interface.

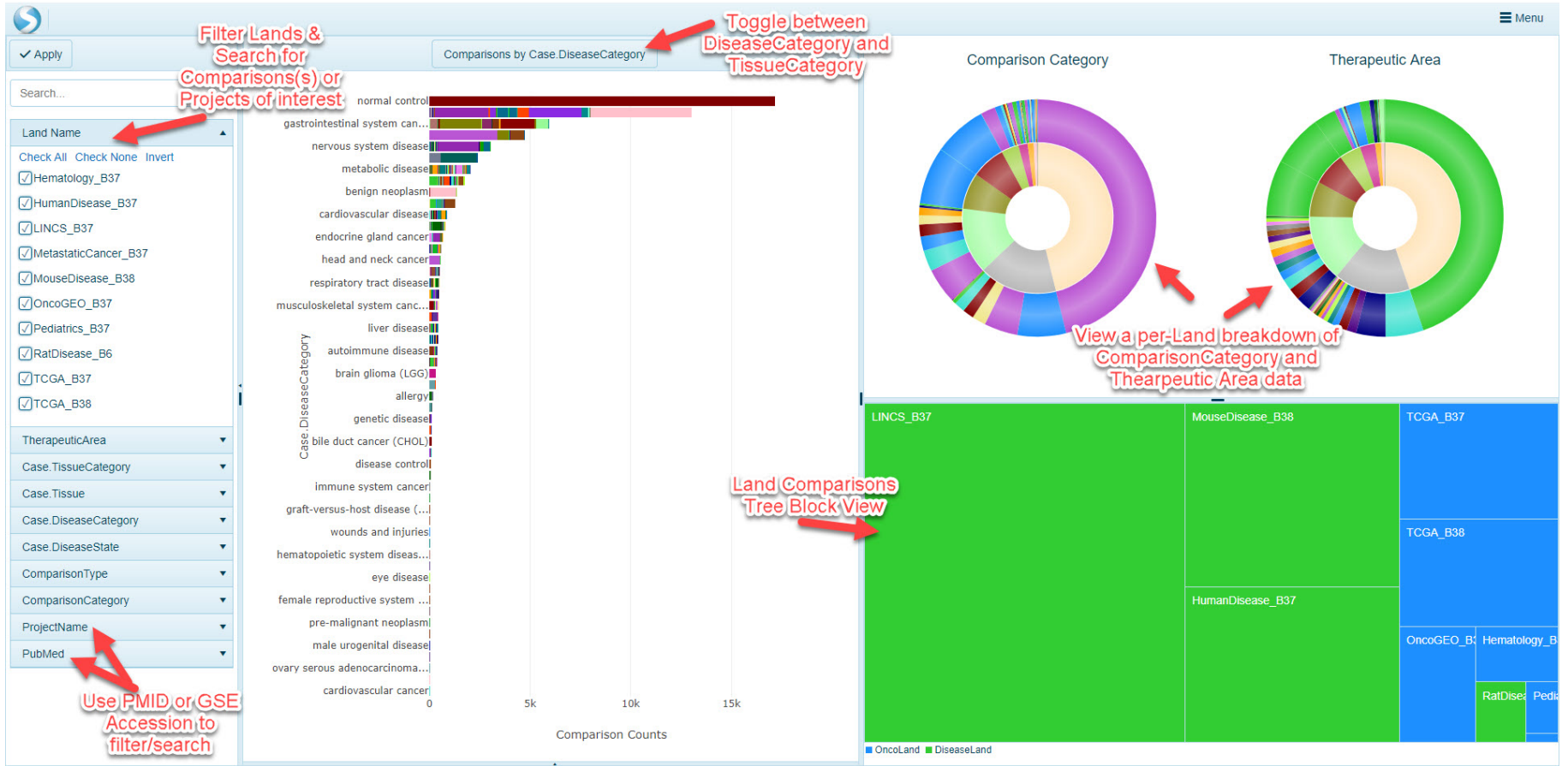
# Regroup the survival data by PTEN mutation status



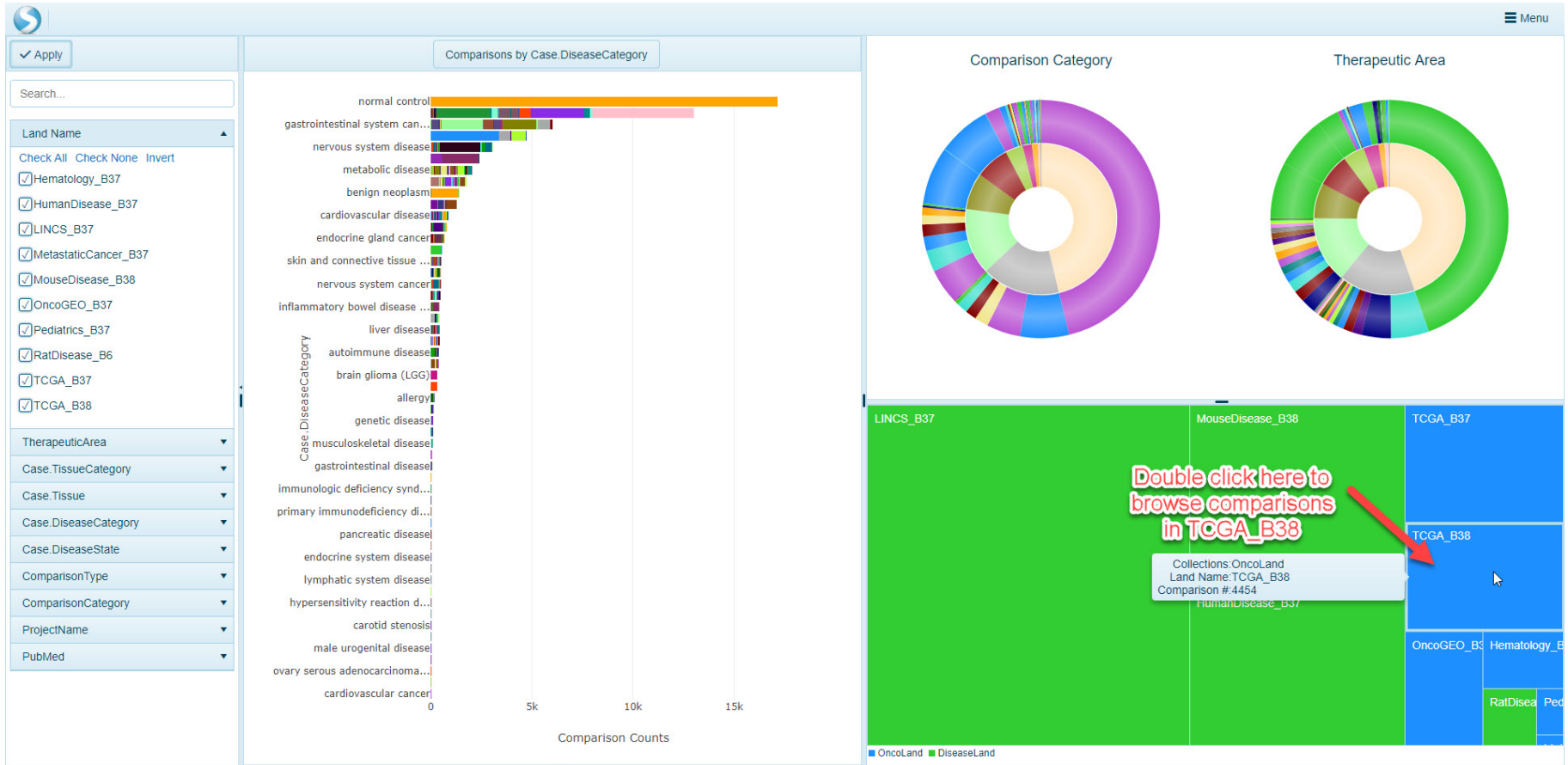
The screenshot shows a software interface for analyzing survival data. At the top, the 'Select land' dropdown is set to 'TCGA\_B38', and the 'Find gene' field contains 'pten'. The 'Gene FPKM' section is visible. On the left, there are controls for 'Custom' filters, an 'Add Filter' button, and an 'Apply' button. Below these are sample selection options: 'SampleID', 'Glioblastoma panel RNA', and 'Glioblastoma Panel'. The main area shows a 'Chart Setting' dropdown set to 'Tumor Type'. A dropdown menu is open, listing options: 'PTEN PTEN R130G', 'PTEN Somatic Mutation [DNaseq] Status', 'SubjectID', and 'Tumor Type'. Two red arrows point to the 'Tumor Type' dropdown and the 'PTEN Somatic Mutation [DNaseq] Status' option. The chart title is 'PTEN by Tumor Type'.











**1 Apply filters**

ucec

Land Name **TCGA\_B38**

TherapeuticArea

Case.TissueCategory

Case.Tissue

Case.DiseaseCategory

Case.DiseaseState **UCEC only**

Check All Check None Invert

endometrial carcinoma (UCEC)

reproductive organ cancer

**2 Double-click on the box to list all available comparisons**

ComparisonContrast	ComparisonID	LandName	ComparisonCategory
TumorOrNormal => Tumor vs Normal	UCEC.GPL11154.Voom...	TCGA_B38	Disease vs. Normal
ZRSR2_Somatic_Mutation_[DNaseq]_Status => MUT vs WT	UCEC.GPL11154.Voom...	TCGA_B38	Other Comparisons
NOTCH1_Somatic_Mutation_[DNaseq]_Status => MUT vs WT	UCEC.GPL11154.Voom...	TCGA_B38	Other Comparisons
TSC1_Somatic_Mutation_[DNaseq]_Status => MUT vs WT	UCEC.GPL11154.Voom...	TCGA_B38	Other Comparisons
GALNT12_Somatic_Mutation_[DNaseq]_Status => MUT vs WT	UCEC.GPL11154.Voom...	TCGA_B38	Other Comparisons

**3 Browse all available comparisons**

TCGA\_B38

OncoLand

✓ Apply

- Land Name ▾
- TherapeuticArea ▾
- Case.TissueCategory ▲
- Case.Tissue ▲
- Case.DiseaseCategory ▲
- Case.DiseaseState ▲
- Check All Check None Invert
- endometrial carcinoma (UCEC)
- ComparisonType ▾
- ComparisonCategory ▾
- ProjectName ▾
- PubMed ▾

Comparisons by Case.DiseaseCategory

Comparison Category    Therapeutic Area

TCGA\_B38

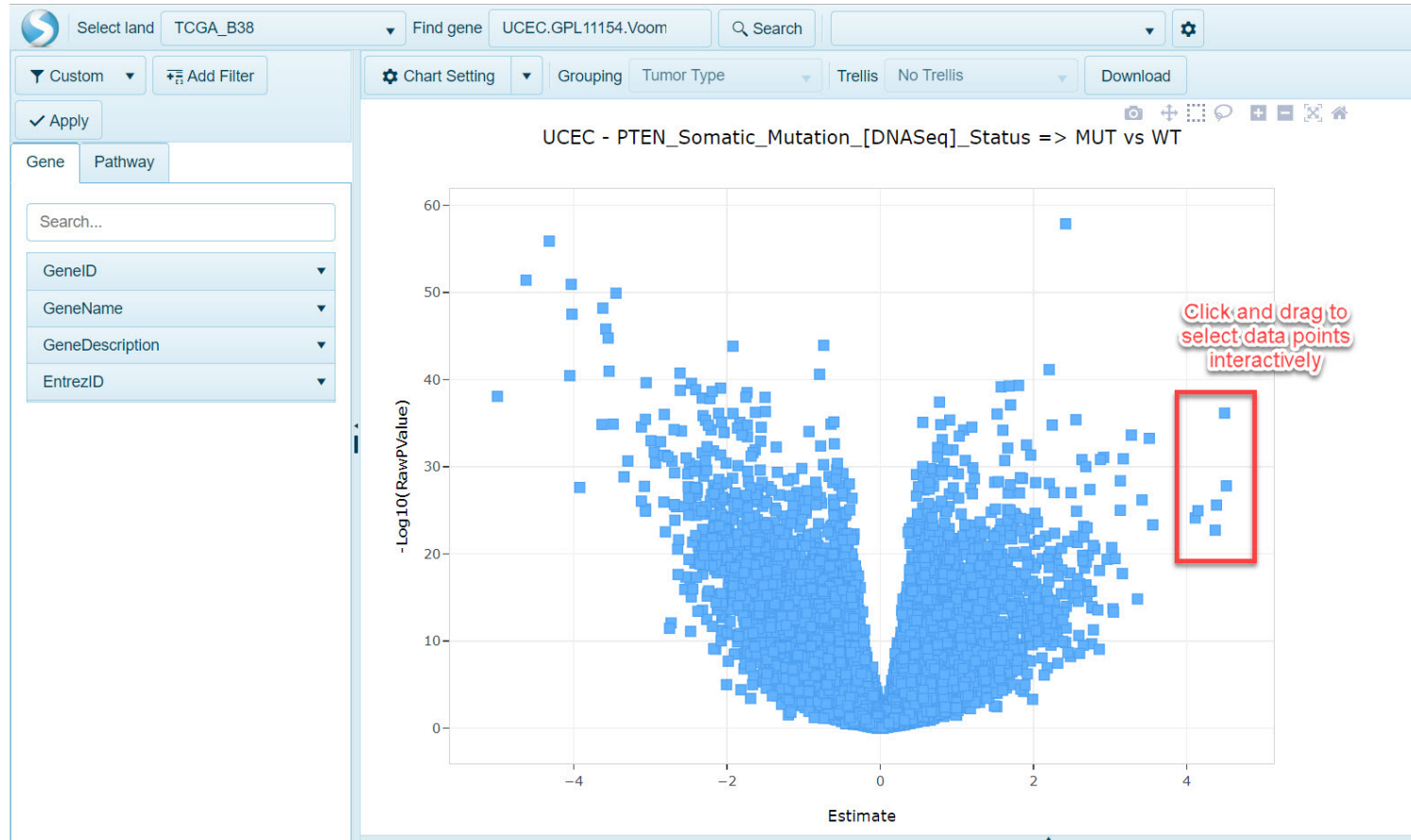
OncoLand

Search for a specific gene of interest here

ComparisonContrast	ComparisonID	LandName	ComparisonCategory
<input type="text" value="pten"/> <div style="border: 1px solid red; padding: 2px;">           PTEN_Somatic_Mutation_[DNaseq]_Sta            =&gt; MUT vs WT         </div>	UCEC.GPL11154.Voom...	TCGA_B38	Disease vs. Normal
=> MUT vs WT	UCEC.GPL11154.Voom...	TCGA_B38	Other Comparisons
NOTCH1_Somatic_Mutation_[DNaseq]_Status => MUT vs WT	UCEC.GPL11154.Voom...	TCGA_B38	Other Comparisons
TSC1_Somatic_Mutation_[DNaseq]_Status => MUT vs WT	UCEC.GPL11154.Voom...	TCGA_B38	Other Comparisons
GALNT12_Somatic_Mutation_[DNaseq]_Status => MUT vs WT	UCEC.GPL11154.Voom...	TCGA_B38	Other Comparisons
PTCH1_Somatic_Mutation_[DNaseq]_Status	...	...	...

# Browse the precalculated data comparing PTEN WT vs MUT expression for all genes



# Select genes to see details and create a gene set

Find gene UCEC.GPL11154.Voom  Menu

Chart Setting Grouping Tumor Type Trellis No Trellis Download

UCEC - PTEN\_Somatic\_Mutation\_[DNaseq]\_Status => MUT vs WT

Download chart or details data

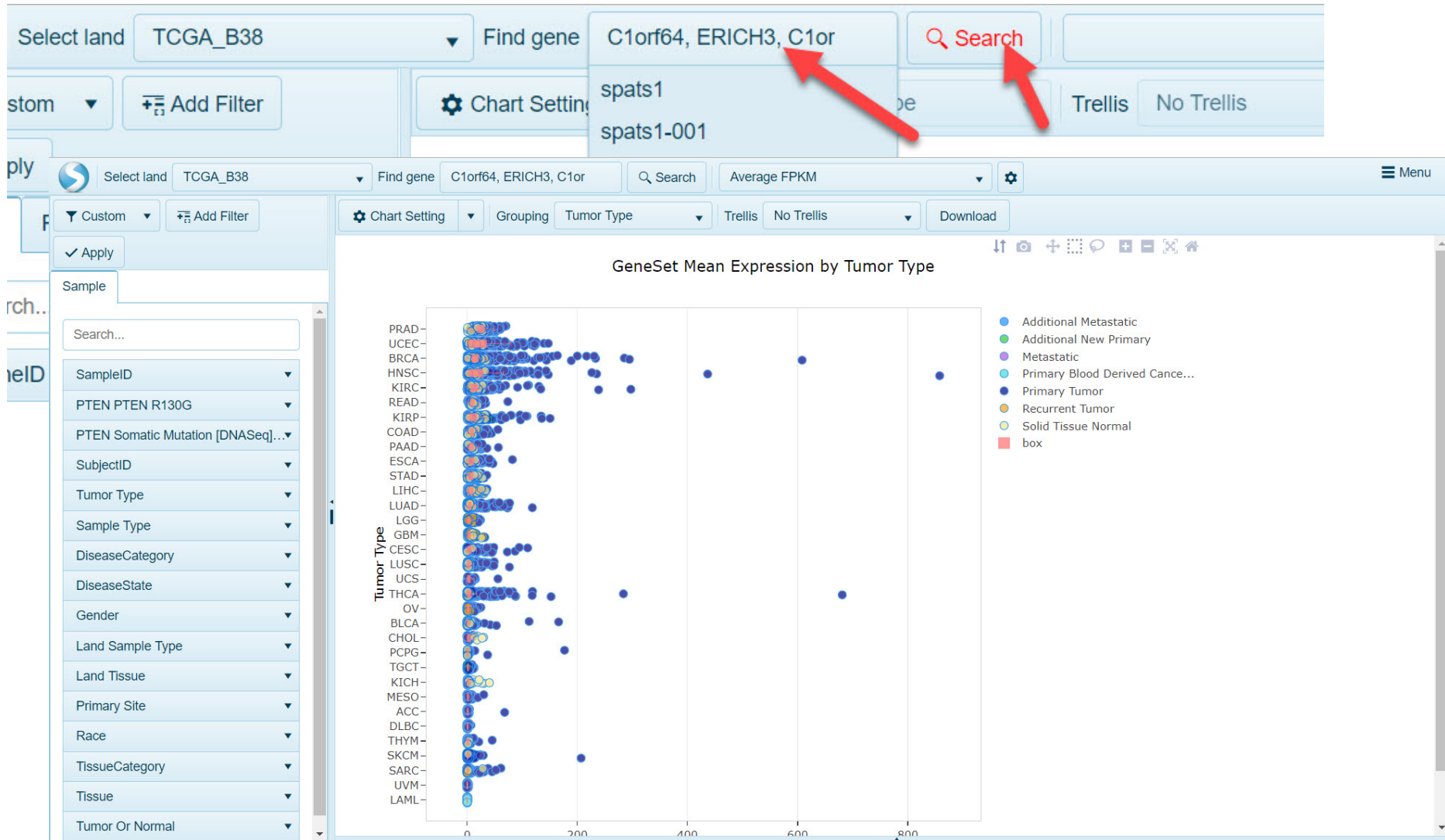
The Details view includes gene names, fold changes, and p values for the selected genes

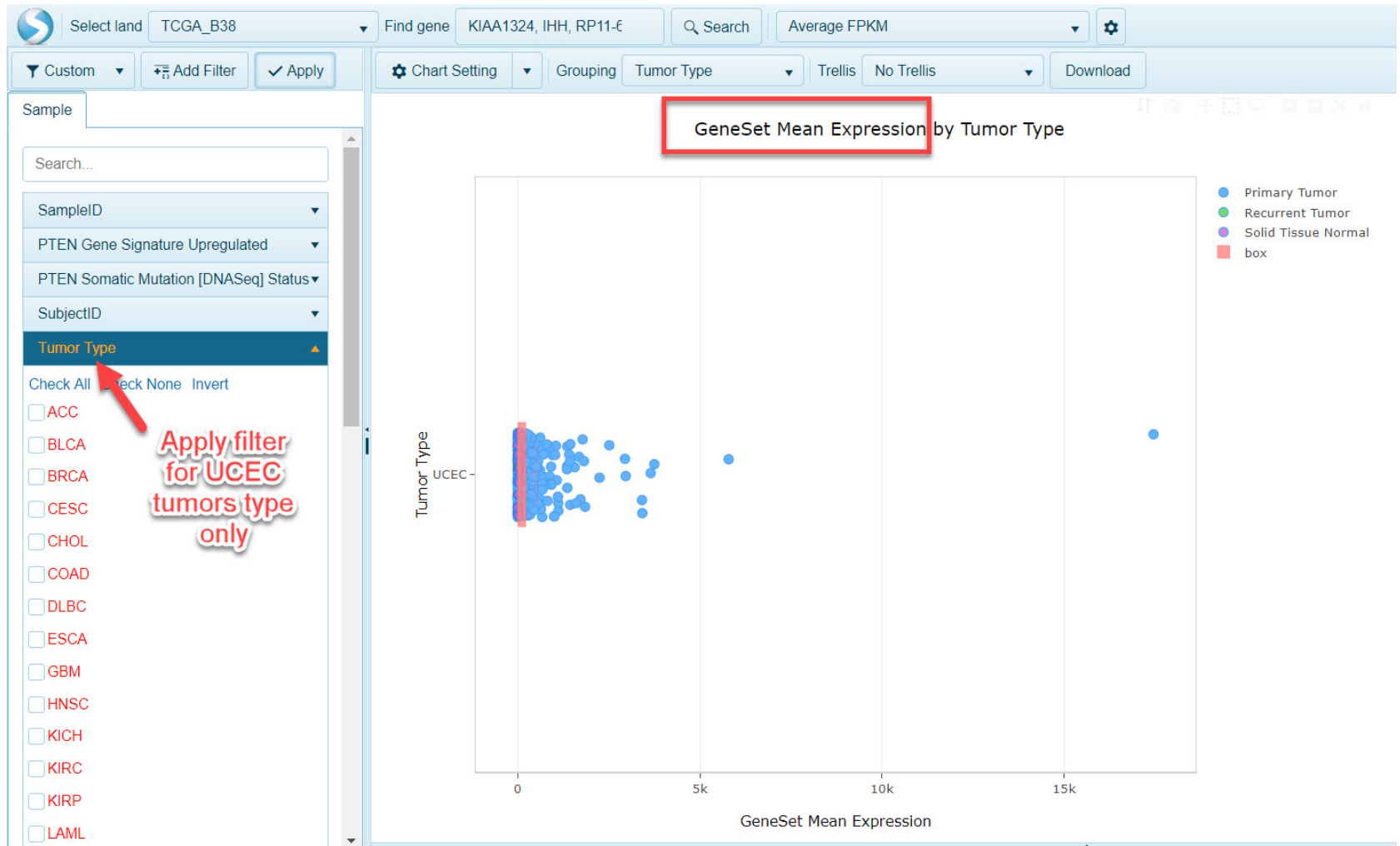
Export to Excel  Select Columns

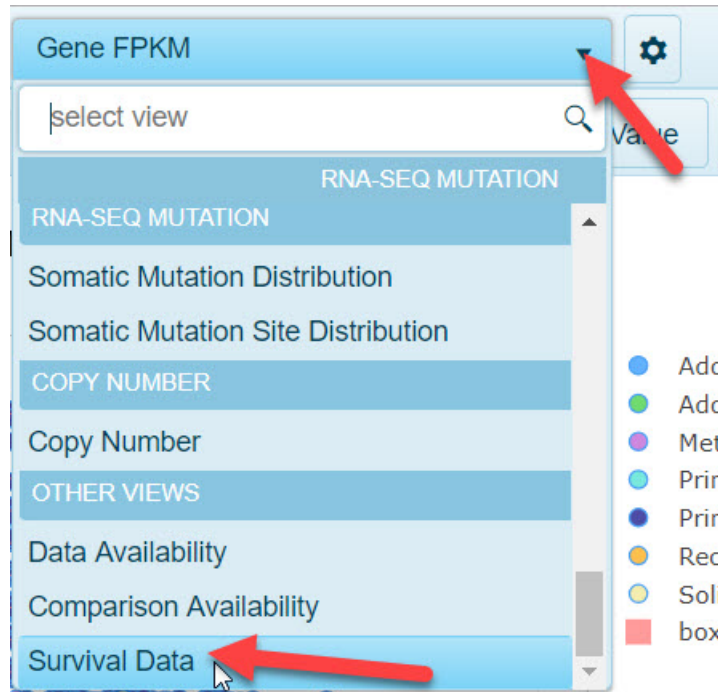
GeneID	UCEC.GPL11...	UCEC.GPL11...	UCEC.GPL11...	GeneName	GeneDescription	Source	Pathway
ENSG0000018388...	3.5559	4.7452e-024	7.6325e-022	C1orf64	chromosome 1 open reading frame 64	protein_coding	MASSARWEH_TA...
ENSG0000017896...	2.9607	4.2752e-020	3.5347e-018	ERICH3	glutamate-rich 3	protein_coding	SENGUPTA_NAS...
ENSG0000017990...	2.8611	8.2461e-019	5.4624e-017	C1orf194	chromosome 1 open reading frame 194	protein_coding	SENGUPTA_NAS...

Page 1 of 1 2... items per page 1 - 43 of 43 items

# Search for gene set expression using the chosen genes

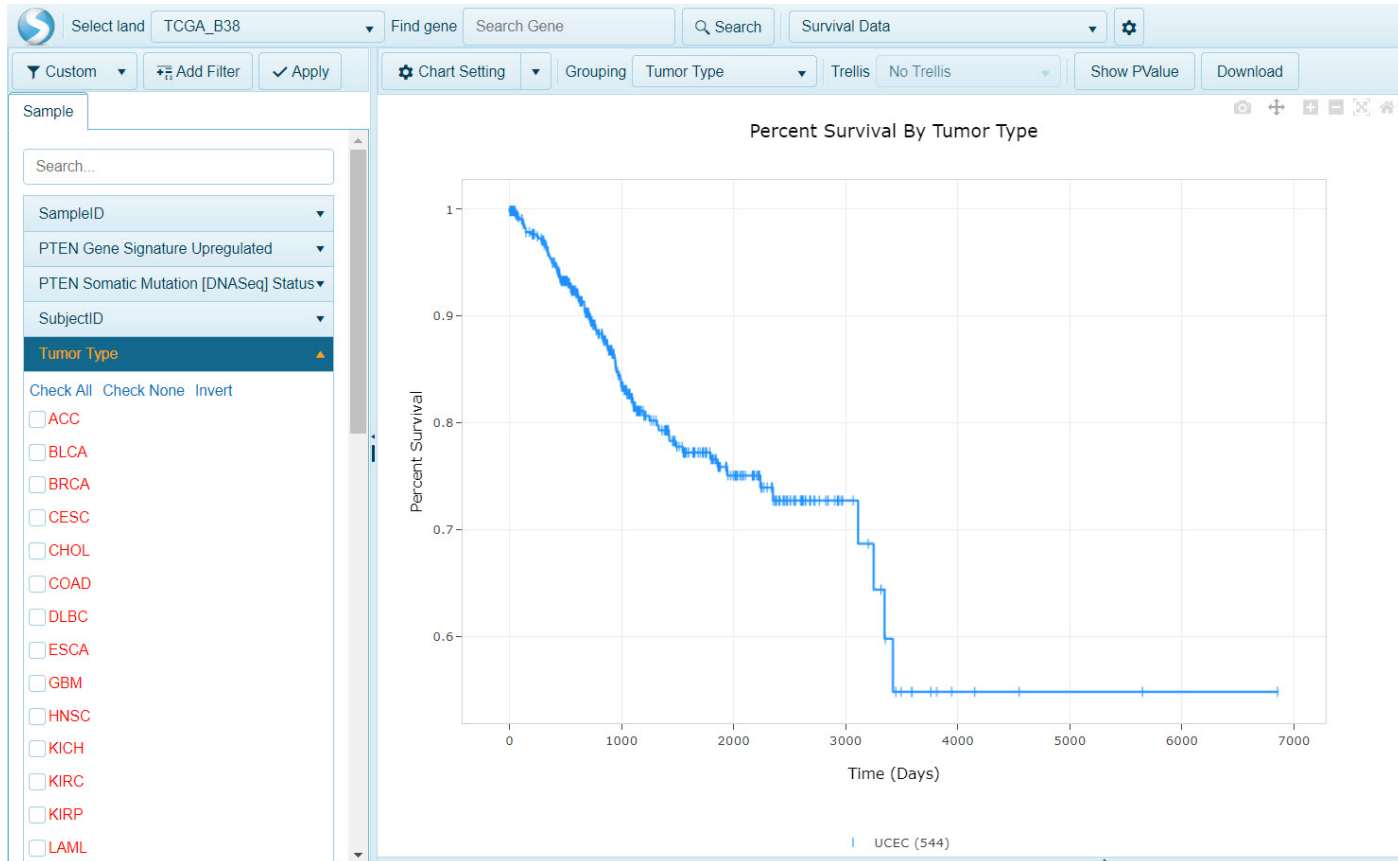


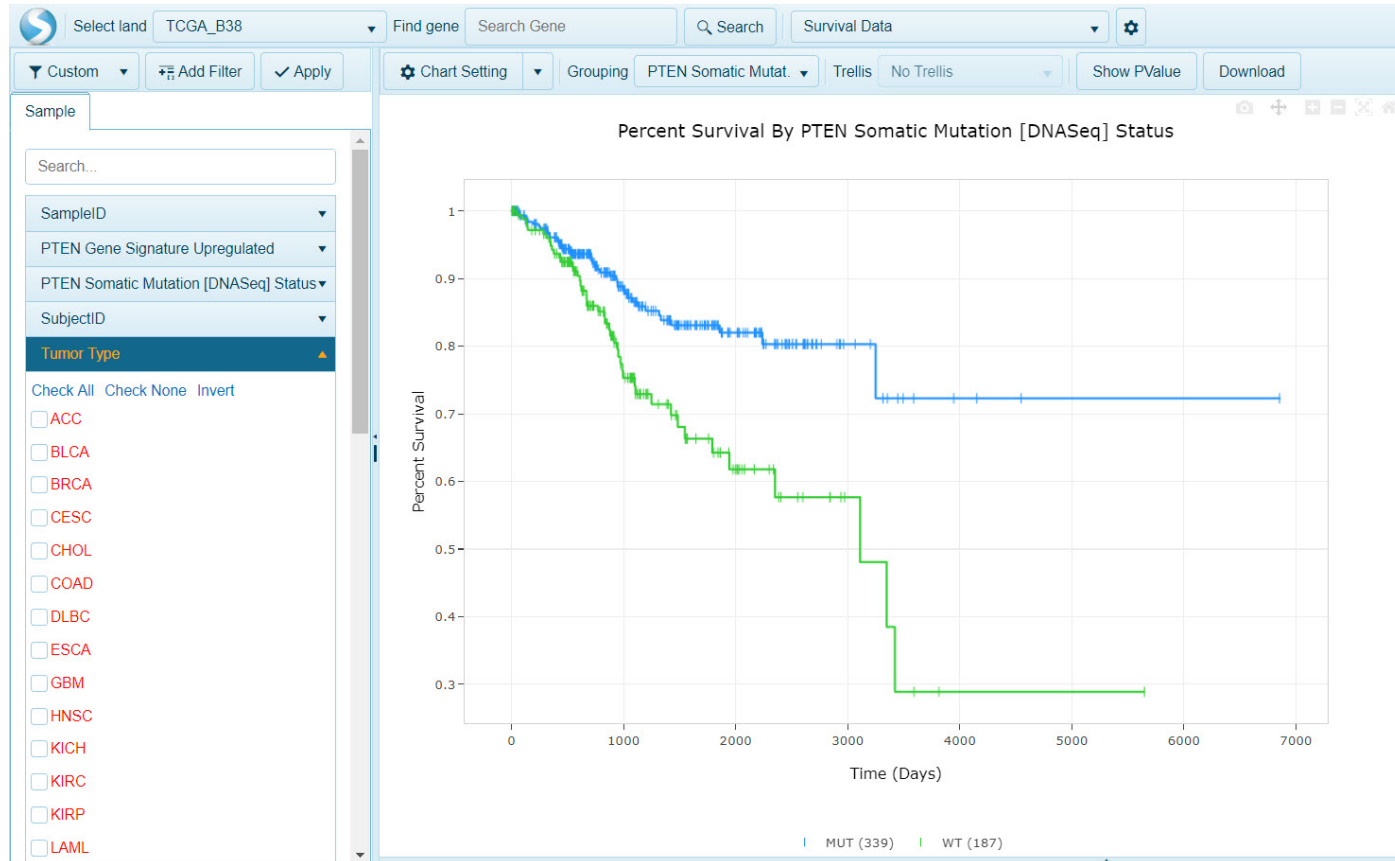






# Recreate previous survival plot with UCEC patients only





# Create custom query for gene set expression of 6 genes

PTEN, GLYATL2, KIAA Search Survival Data

### Rna-Seq Expression

Gene(s): GLYATL2, KIAA1324, TFF3, IHH, LINC00261, PTEN

**Compare**

- Compare to the mean of ALL samples in the same primary group
- Compare to the mean of all pooled controls from all groups
- Compare to the mean of controls in the same primary group

Upregulation cutoff: 1 Downregulation cutoff: -1

**Categorize**

- Generate up/down status for Q4 and Q1 in the same primary group
- Generate up/down status for Q4 and Q1 in the same project
- Generate Up/down/NoChange status based on ORIGINAL values
- Categorize numeric values by user-defined breakpoints (add percentage to indicate percentiles)

**Return**

- Return expression values

Summarize multiple genes by Median

Query name (optional): PTEN Signature

OK Cancel



Land explorer provides an opportunity to simply and rapidly browse, filter, and visualise the millions of data points and annotations in the Lands

- Found all TCGA expression data for PTEN across different cancer types
- Visualised the distribution of PTEN somatic mutations across TCGA samples
- Profiled the landscape of PTEN mutations across endometrial carcinoma samples
- Examined Kaplan-Meier survival plots for endometrial carcinoma separated by PTEN mutation status
- Browsed and filtered the prebuilt comparisons for expression data comparing endometrial carcinoma samples with- or without somatic mutations in PTEN
- Selected genes from the volcano plot visualisation and created an RNA-Seq gene set
- Used the gene set expression characteristics as a surrogate for PTEN mutation status as a prognostic indicator in endometrial carcinoma

Thank you for your attention!



Questions?

**[Michelle.Engle@qiagen.com](mailto:Michelle.Engle@qiagen.com)**

**[omicsoft.support@qiagen.com](mailto:omicsoft.support@qiagen.com)**

Home > Land Explorer

A screenshot of the OmicSoft Land Explorer landing page. The background is a scenic view of a mountain range with a person in a yellow jacket looking through binoculars in the foreground. The text is centered over the image.

## OmicSoft Land Explorer

### A world of 'omics data at your fingertips

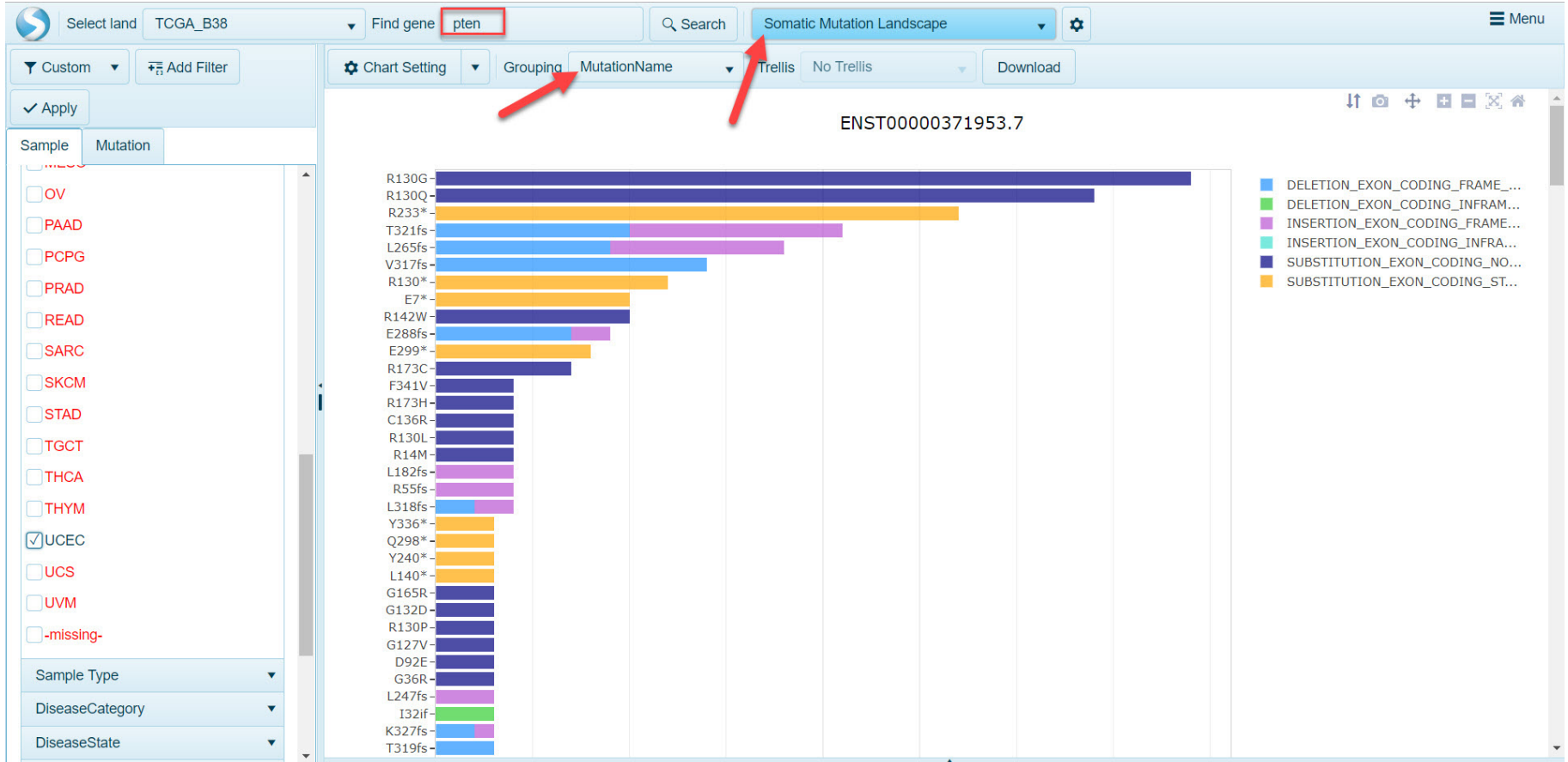
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Visit (<https://www.qiagenbioinformatics.com/land-explorer/>) to sign up for your free trial today!

# Switch to Somatic Mutation Landscape view to view specific amino acid changes in PTEN mutations





Search Somatic Mutation Distribution

Dna-Seq Somatic Mutation

Gene(s): pten,

Return AAMutation classification

Contains specific AA change (e.g. V600E): R130G

Variant type

Variant location

Variant consequence

Exclude common SNPs by 1000 genomes with frequency cutoff

Exclude mutations without functional consequence

Query name (optional): PTEN R130G

OK Cancel

