IOSig: immuno-oncology signatures explorer in immunotherapy treated pan-cancer cohorts

Samuel Coleman[1,2], Caroline Wheeler[3], Rebecca Hoyd[3], Louis Denko[3], Ching-Nung Lin[1,2], Muhammad Zaki Hidayatullah Fadlullah[1], Siwen-Hu-Lieskovan[1], Christine H. Chung[4], Ahmad A. Tarhini[5], Daniel Spakowicz[3], and Aik Choon Tan[1,2]*, 2023 Bioinformatics (In-Revision)

Introduction

- Immuno-oncology signatures explorer (IOSig) is a web interface that allows users to query and explore immune checkpoint blockade treated cohorts with gene expression signatures for the purpose of predicting response to treatment.

- Users can upload their own gene expression signature, gene expression and clinical data, or query the data built in to IOSig.

The About page contains additional information about IOSig and the three analysis modules included in IOSIg

IOSig ∙∙ **Immuno-Oncology SIGnatures explorer**

About IOSig

Immuno-Oncology Signatures Explorer (IOSig) is an interactive Shiny application meant to facilitate the investigation of immune checkpoint inhibitor (ICI) treated datasets with gene expression biomarker signatures for prediction of responder / non-responder. Previously published gene expression signatures have been collected in addition to publicly available ICI treated RNA-seq cohorts to allow for query their own datasets or signatures against. In addition, it also possible to explore the data within the application without providing your own.
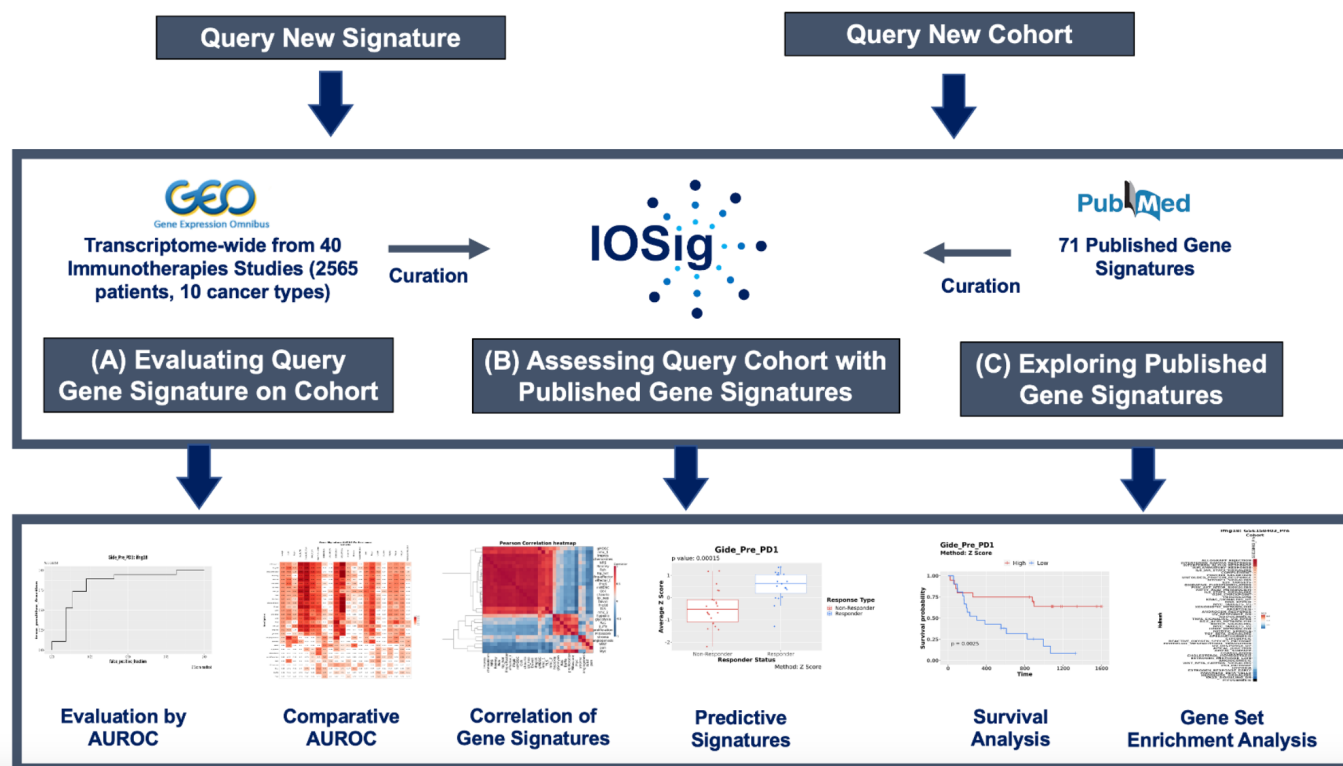
The Dataset Overview Tab details the RNA-seq datasets and Signatures included in IOSig

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About   **Dataset Overview**   Dataset Analysis   User Signature Analysis   Published Signature Analysis

Expression Data Overview   Signature Overview

Expression data included in this application:

Show 10 entries   Search: _____

	Data Set ID	N	Cancer Type	Pre On Post	Drug	Treatment Group	Survival Data	Library Prep	Tissue Source	Biosources	Clinical Trials ID	Platform	PMID
1	GSE67501	11	Kidney	Pre	Nivolumab	Anti-PD1		total	FFPE	Tissue	NCT00441337, NCT00730639, NCT01354431, NCT01358721	Microarray	27491898
2	GSE99070	10	Malignant Pleural Mesothelioma	Pre	Nivolumab	Anti-PD1		total	FFPE	Tissue		Microarray	29618661
3	GSE111414	20	NSCLC	Pre/On	Nivolumab	Anti-PD1		total	FFPE	PBMC		RNA-seq	30765392
4	GSE1154538	26	GI cancer	Pre/Post	Nivolumab	Anti-PD1		polyA		Tissue		RNA-seq	34014607
5	GSE1558403	81	Melanoma	Pre/On	Durvalumab	Anti-PD-L1	OS	polyA		Tissue	NCT02027961	RNA-seq	33288749
6	GSE165252	71	Esophageal	Pre/On/Post	Atezolizumab	Anti-PD-L1		total		Tissue	NCT03087864	RNA-seq	33504550
7	GSE165278	22	Melanoma	Pre/Post	Ipilimumab	Anti-CTLA4	OS	total		Tissue	NCT00796991,NCT00495066, NCT00920907, NCT00324155, NCT00162123, NCT0140045 and NCT00289640, NCT00495066, NCT00636168, NCT01515189, NCT00086489, NCT00471887	RNA-seq	33588426
8	GSE1173839	71	Breast	Pre	Durvalumab	Anti-PD-L1		total	FFPE	Tissue	NCT01042379	Microarray	34143979
9	GSE176307	87	Bladder	Pre	Atezolizumab/Pembrolizumab/Nivolumab/Durvalumab/Avelumab	Anti-	OS	total	FFPE	Tissue		RNA-seq	34294892

The Dataset Analysis module (red) allows the user to upload RNA-seq gene expression data with paired clinical data for analysis using the built-in IOSig signatures.

The data is loaded in on the Import tab (blue). Users upload their data and filter the comparison datasets on the side panel (green). The analysis results are located in the additional subtabs (yellow).

The user signature method (red) allows users to upload a list of genes that are used to predict response to immune checkpoint inhibitor treatment. Data is uploaded on the side panel (green) of the Summary tab (blue). Additional filtering of comparison datasets and gene signatures takes place on the side panel (green). The results of the analysis are found in the additional subtabs of the User Signature Analysis page (yellow).

IOSig ··· **Immuno-Oncology SIGnatures explorer**

About   Dataset Overview   Dataset Analysis   **User Signature Analysis**   Published Signature Analysis

Summary   AUROC Overview   AUROC Comparison   AUROC Correlation   Survival   Mann Whitney   GSEA

Signature Analysis

Enter a unique signature name

[User_Signature]

Enter new line separated HGNC symbols. Example Signature File

[Paste HGNC Symbols]

Basic Filtering

Advanced Filtering

Sort datasets by cancer type

[Pan]

Reset Filter
Select datasets to query
☑ GSE67501
☑ GSE99070
☑ GSE111414_Pre
☑ GSE111414_On
☑ GSE154538_Post
☑ GSE154538_Pre
☑ GSE158403_Pre
☑ GSE158403_On

Clinical Filter Table

Show [10] entries

Search: [   ]

	Cohort	Cancer_Type	Survival	Metric	Tissue_Source	Lib_Prep	Treatment	Treatment_Group
1	GSE67501	Kidney	false		FFPE	total	Nivolumab	Anti-PD1
2	GSE99070	Malignant Pleural Mesothelioma	false		FFPE	total	Nivolumab	Anti-PD1
3	GSE111414_Pre	NSCLC	false		FFPE	total	Nivolumab	Anti-PD1
4	GSE111414_On	NSCLC	false		FFPE	total	Nivolumab	Anti-PD1
5	GSE154538_Post	GI Cancer	false			polyA	Nivolumab	Anti-PD1
6	GSE154538_Pre	GI Cancer	false			polyA	Nivolumab	Anti-PD1
7	GSE158403_Pre	Melanoma	true	OS		polyA	Durvalumab	Anti-PD-L1
8	GSE158403_On	Melanoma	true	OS		polyA	Durvalumab	Anti-PD-L1
9	GSE165252_On	Esophageal Cancer	false			total	Atezolizumab	Anti-PD-L1
10	GSE165252_Pre	Esophageal Cancer	false			total	Atezolizumab	Anti-PD-L1

Showing 1 to 10 of 57 entries

Previous 1 2 3 4 5 6 Next

The Published Signature Analysis method (red) allows users to query the gene expression and signature data built into IOSig. Users can filter the datasets and select gene signature sets on the side panel (green) of the Summary screen (blue). The results of the analysis can be found in the additional subtabs (yellow) of the Published Signature Analysis page (red).

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About   Dataset Overview   Dataset Analysis   User Signature Analysis   **Published Signature Analysis**

Summary   AUROC Overview   AUROC Comparison   AUROC Correlation   Survival   Mann Whitney   GSEA

Published Signature Analysis

Select a previously published signature.

Angiogenesis ▾

Confirm selections

Basic Filtering

Advanced Filtering

Optionally sort by cancer type

Pan

Reset Filters

Select datasets to query.
- ☑ GSE67501
- ☑ GSE99070
- ☑ GSE111414_Pre
- ☑ GSE111414_On
- ☑ GSE154538_Post
- ☑ GSE154538_Pre
- ☑ GSE158403_Pre

Clinical Filter Table

Show 10 entries

Search:

	Cohort	Cancer_Type	Survival	Metric	Tissue_Source	Lib_Prep	Treatment	Treatment_Group
1	GSE67501	Kidney	false		FFPE	total	Nivolumab	Anti-PD1
2	GSE99070	Malignant Pleural Mesothelioma	false		FFPE	total	Nivolumab	Anti-PD1
3	GSE111414_Pre	NSCLC	false		FFPE	total	Nivolumab	Anti-PD1
4	GSE111414_On	NSCLC	false		FFPE	total	Nivolumab	Anti-PD1
5	GSE154538_Post	GI Cancer	false			polyA	Nivolumab	Anti-PD1
6	GSE154538_Pre	GI Cancer	false			polyA	Nivolumab	Anti-PD1
7	GSE158403_Pre	Melanoma	true	OS		polyA	Durvalumab	Anti-PD-L1
8	GSE158403_On	Melanoma	true	OS		polyA	Durvalumab	Anti-PD-L1
9	GSE165252_On	Esophageal Cancer	false			total	Atezolizumab	Anti-PD-L1
10	GSE165252_Pre	Esophageal Cancer	false			total	Atezolizumab	Anti-PD-L1

Showing 1 to 10 of 57 entries

Previous 1 2 3 4 5 6 Next

Signature Overview   ## Gene Overview