

# User Manual of IBDCCompare

## October 2, 2023

IBDCCompare is a data comparison and visualization tool based on interesting genes/pathways. Users began IBDCCompare by selecting “GENE” or “PATHWAY” options (red box in Figure 1). If selecting “GENE” option, users need to input the query genes in the blue box (genes must be separated by commas). If selecting “PATHWAY” option, users need to select a pathway database from KEGG and Reactome and then select interesting pathways from a drop-down list that include 311 KEGG pathways or 1414 Reactome pathways. Then, after selecting the diseases (CD or UC) and other optional attributes (e.g. tissues or treatments) in green box, the related datasets will be shown in the table. Users can click the “select all” button (grey box) to select all datasets or manually refine the datasets. Clicking the “Compare Datasets” button (yellow box), IBDCCompare will compare the comparisons from all selected datasets for the query genes or pathways.

IBDCCompare   Dataset Selection   Results Panel

REQUIRED

TARGET INPUT

GENE

PATHWAY

Enter a list of gene names  
(genes must be separated by commas)

OSM, IL1B, TNF

Select diseases of interest

UC CD

OPTIONAL

Select tissues of interest

Colon

Select cell types of interest

Select treatments of interest

Infliximab

Select timepoints of interest

W0

confirm selections

Compare Datasets

The table below allows you to explicitly select datasets that you would like to compare. By default, all datasets are selected. If you are only interested in a few datasets, you can click the **deselect all** button and then make your selections. Click the **Compare Datasets** button to display results across selected data. Results will be displayed in the Results Panel.

select all

deselect all

Showing 1 to 4 of 4 entries

Search:

dataset_acc	title	disease	organism	experiment_type	source	treatment	timepoint	dos
GSE73661	The effect of vedolizumab and infliximab...	UC/nonIBD	Human	Microarray	Colon	Vedolizumab;Infliximab...	W0;W4_6;W6;W12;W52	
GSE16879	Mucosal expression profiling in patie...	CD;UC;Healthy	Human	Microarray	Colon/Ileum	Infliximab	W0;W4_6	Smpl
GSE23597	Expression data from colonic biopsy s...	UC	Human	Microarray	Colon	Infliximab;Placebo	W0;W8;W30	Smpl
GSE12251	A Predictive Response Signature to In...	UC	Human	Microarray	Colon	Infliximab	W0	Smpl

Figure 1. Data selection in IBDCCompare.

The comparison results are shown in the “Results Panel” tab. This tab includes four sub-tabs: Summary, Comparison Tables (Results), Expression Visuals, Database View. Summary tab show the query parameters and number of datasets and comparisons that include the query genes/pathways for each disease.

IBDCompare

Dataset Selection

Results Panel

Summary

Comparison Tables (Results)

Expression Visuals

Database View

### Summary of Query and Matching Datasets

The following output contains comparisons that meet the user specified criteria displayed below.

- genes - OSM, IL1B, TNF
- diseases - UC, CD
- sources - Colon
- treatments - Infliximab
- timepoints - W0

Summary for **UC** : 4 datasets (42 comparisons) were returned based on the user specified queries.

- OSM - found in 4 datasets (42 comparisons)
- IL1B - found in 4 datasets (42 comparisons)
- TNF - found in 4 datasets (42 comparisons)

Summary for **CD** : 1 datasets (24 comparisons) were returned based on the user specified queries.

- OSM - found in 1 datasets (24 comparisons)
- IL1B - found in 1 datasets (24 comparisons)
- TNF - found in 1 datasets (24 comparisons)

Figure 2. Summary tab in the Results Panel

In the “Comparison Tables (Results)” tab, “Summary of Results” panel includes the number of datasets and comparisons related to each query gene/pathway based on each disease and each platform (red box in Figure 3). “Results” panel includes the comparison results. The tables are first separated by disease and then by dataset. The top panel of each dataset table includes the details of the dataset and bottom panel is the significant status of each gene/pathway in each comparison. “up”, “down” and “NS” mean gene/pathway is up-regulated, down-regulated or not significant in the comparison, respectively. For example, IL1B is up-regulated in the comparison “CD responder at W0 vs Healthy”. Hovering the mouse over each cell can get detailed statistic values. Users can modify the threshold to change the status of each gene/pathway in each comparison by clicking the “Table Options” button (orange box).

After selecting one or multiple comparisons, users can click the “Filter Comparisons” button (blue box) to only remove all unselected comparisons or check “Include similar comparisons” in the pop-up dialog to only keep the comparisons with the same name with the selected comparisons. For the gene-level query, users can also click “Visualize Comparisons” to plot the boxplots for each gene in each comparison in the “Expression Visuals” panel.

**Summary of Results**

gene	Microarray	RNASeq
<b>UC</b>		
OSM	4/4 (100%)	NA
IL1B	4/4 (100%)	NA
TNF	2/4 (50%)	NA
<b>CD</b>		
OSM	1/1 (100%)	NA
IL1B	1/1 (100%)	NA
TNF	1/1 (100%)	NA

gene	Microarray	RNASeq
<b>UC</b>		
OSM	13/42 (30.95%)	NA
IL1B	17/42 (40.48%)	NA
TNF	4/42 (9.52%)	NA
<b>CD</b>		
OSM	8/24 (33.33%)	NA
IL1B	11/24 (45.83%)	NA
TNF	3/24 (12.5%)	NA

**Table Options**

Set a threshold for the p-value: 0.05

Set a threshold for the logFC: 1

Remove NS comparisons: ☐

**Filter Comparisons** **Remove Filter** **Visualize Comparisons**

**CD;UC**

data ID	annotation	group	comparison	OSM	IL1B	TNF	selection
Title: Mucosal expression profiling in patients with inflammatory bowel disease before and after first infliximab treatment							
Source: Colon;Ileum							
CellType: NA							
Treatment: Infliximab							
Timepoints:							
GSE16872	CD;Colon;W0;Responder;Colon;Healthy	Colon	CD, W0, Responder vs Healthy	NS	up		
GSE16872	CD;Colon;W4_6;Responder;Colon;Healthy	Colon	CD, W4_6, Responder vs Healthy	NS	up	NS	<input type="checkbox"/>
GSE16872	CD;Colon;W0;NonResponder;Colon;Healthy	Colon	CD, W0, NonResponder vs Healthy	up	up	NS	<input type="checkbox"/>
GSE16872	CD;Colon;W4_6;NonResponder;Colon;Healthy	Colon	CD, W4_6, NonResponder vs Healthy	up	up	up	<input type="checkbox"/>

name: IL1B  
logFC: 3.1023  
p-value: 0  
adj p-value: 1e-05

Figure 3. Comparison Tables tab in the Results Panel

In the “Expression Visuals” tab, each row represents a query gene and each column represents a comparison. Users can change the layout by clicking the top-left button (red box in Figure 4). Users can also perform meta analysis by clicking the “Run Meta Analysis” button (blue box). The meta result table will be shown under the boxplots. The table includes gene name, meta p value, meta adjusted p value and directionality. Clicking the triangle button can show the details of each gene in all selected comparisons.

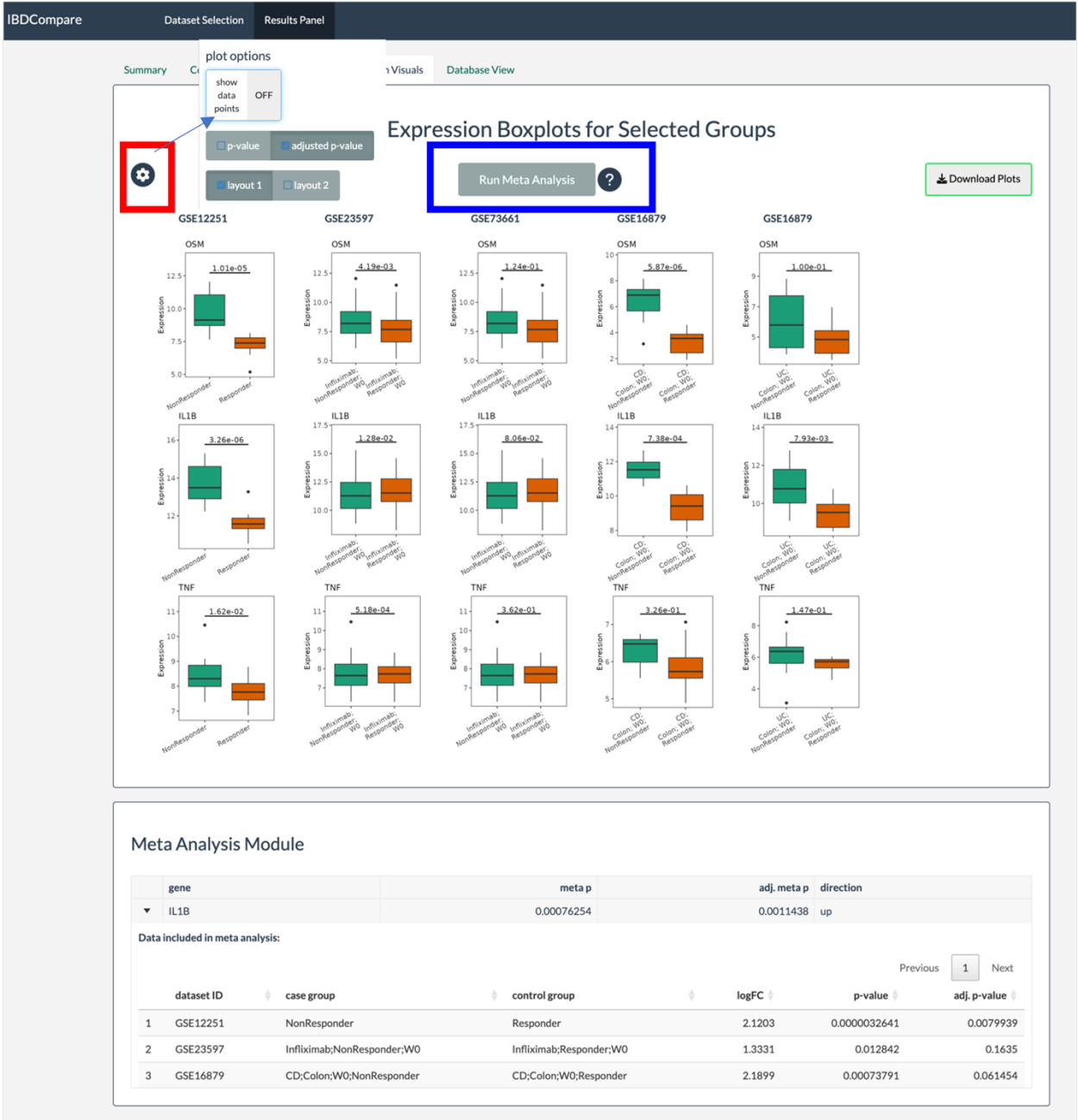


Figure 4. Expression Visuals tab in the Results Panel

“Database View” tab provides the information of the query genes in nine public databases. Clicking the “link” can check the gene information in each database.

IBDCompare			
Dataset Selection			
Results Panel			
Summary	Comparison Tables (Results)	Expression Visuals	Database View
Database Links			
general			
NCBI (National Center for Biotechnology Information)	<a href="#">link</a>	<a href="#">link</a>	<a href="#">link</a>
function			
GO (Gene Ontology)	<a href="#">link</a>	<a href="#">link</a>	<a href="#">link</a>
REACTOME	<a href="#">link</a>	<a href="#">link</a>	<a href="#">link</a>
KEGG (Kyoto Encyclopedia of Genes and Genomes)	<a href="#">link</a>	<a href="#">link</a>	<a href="#">link</a>
target related			
Drug Target Commons	<a href="#">link</a>	<a href="#">link</a>	<a href="#">link</a>
TTD (Therapeutic Target Database)	<a href="#">link</a>	<a href="#">link</a>	<a href="#">link</a>
Drug Bank	<a href="#">link</a>	<a href="#">link</a>	<a href="#">link</a>
CHEMBL	<a href="#">link</a>	<a href="#">link</a>	<a href="#">link</a>
PharmGKB (Pharmacogenomics Knowledge Base)	<a href="#">link</a>	<a href="#">link</a>	<a href="#">link</a>

Figure 5. Database View tab in the Results Panel