

# TSI Manual

The tau index indicates how specific or broadly expressed a gene or transcript is, within studied tissues.

The index  $\tau$  is defined as:

$$\tau = \frac{\sum_{i=1}^N (1 - x_i)}{N - 1}$$

Where,  $N$  is the number of tissues and  $x_i$  is the expression profile component normalized by the maximal component value (Yanai et al., 2005)

The values of tau vary from 0 to 1:

Ubiquitous or broad expr ( $\tau \leq 0.5$ )

Intermediate expr ( $0.5 < \tau < 0.9$ )

Tissue-specific or narrow expr ( $\tau \geq 0.9$ )

TSI calculator allows user to calculate tissue specificity index using normalized expression profile of genes.

Users can follow the following steps to get the TSI table.

## 1. Input data:

First click on ‘choose file’ to choose the CSV file of expression value. Browse the file from your system and open it.

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### TSI: Tissue Specificity Index

The tissue specificity index is a measure of the relative expression of a gene across different tissues or cell types. It is commonly used to identify genes that are highly expressed in a specific tissue, which can provide insights into the function of that tissue and the roles of the genes involved. The tissue specificity index is calculated by comparing the expression of a gene in a specific tissue to its expression in all other tissues in a given dataset. Genes with a high tissue specificity index are considered to be highly tissue-specific and may be involved in tissue-specific functions, while genes with a low tissue specificity index are considered to have a more universal role. The tissue specificity index is a useful tool for studying gene expression patterns and tissue-specific functions.

Select to upload CSV file:  No file chosen

[click here for the example file](#)



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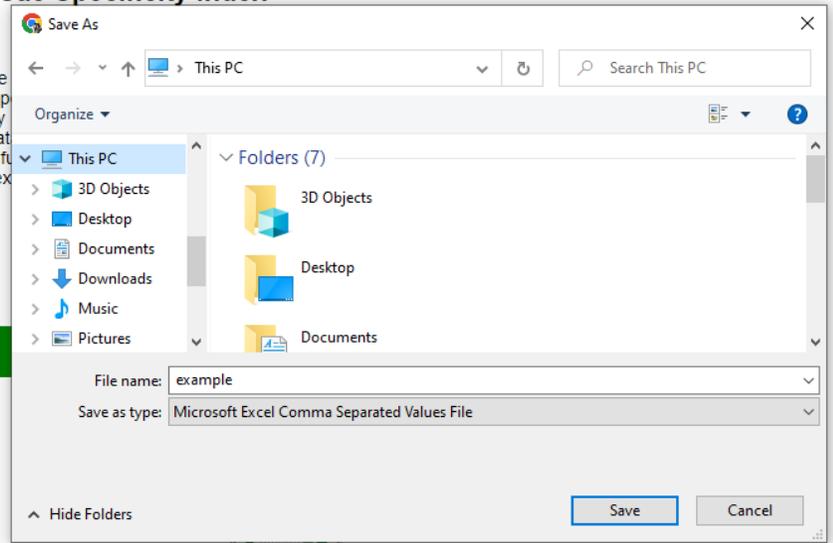
You can also use 'example file' to RUN the TSI calculation. Click on 'click here for the example file' to download the example file.

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[click here for the example file](#)



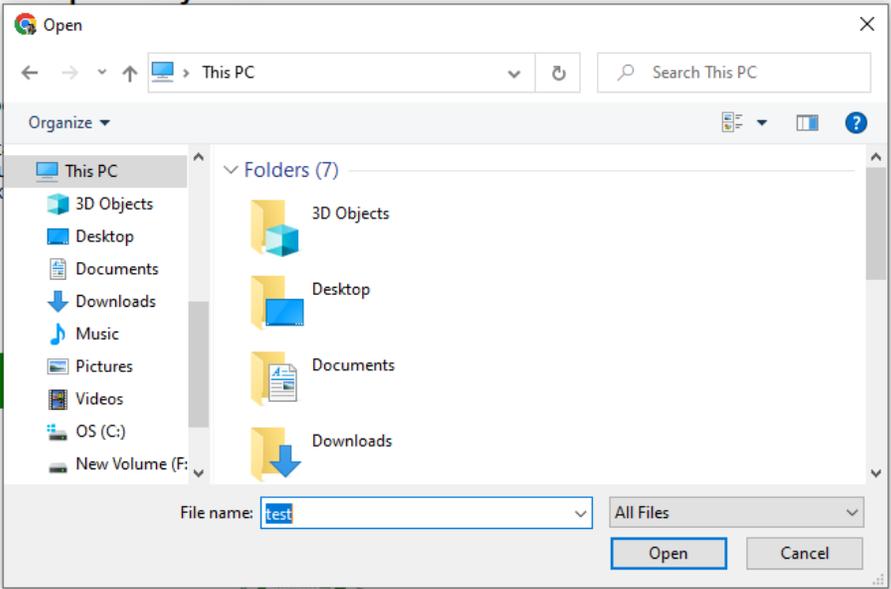
Save the file in your system. Then chose this file to run TSI calculation.

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[click here for the example file](#)



The image shows a screenshot of a web application interface for TSI calculation. On the left, there is a text description of the Tissue Specificity Index and a 'Choose File' button. A green button labeled 'click here for the example file' is also present. On the right, a Windows 'Open' file dialog box is overlaid, showing the 'This PC' view with various folders like 3D Objects, Desktop, Documents, Downloads, Music, Pictures, Videos, OS (C:), and New Volume (F:). The 'File name' field contains 'test' and the file type is set to 'All Files'. The 'Open' button is highlighted.



## 2. Run the TSI calculation:

After choosing the file Click 'submit' button to submit your file and run the analysis.

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### TSI: Tissue Specificity Index

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Select to upload CSV file:  test.csv

[click here for the example file](#)



### 3. Get the results

Results will appear on screen after TSI calculation at server.

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The Tissue specificity Index  
0 : housekeeping genes  
greater than or equal to 0.9 : tissue-specific genes

S.NO.	Gene id	TSI
1	CB_lnc_0001	0.43777632225315
2	CB_lnc_0006	0.90412517780939
3	CB_lnc_0010	0.74226804123711
4	CB_lnc_0011	0.47204641350211
5	CB_lnc_0012	0.92444963308873

#### 4. Download the results

Results can be downloaded by clicking on ‘click here for the results file’ at the bottom.

[click here for the result file](#)

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Results will be downloaded in .txt file format

S.No.	gene_ID	TSI
1	CB_lnc_0001	0.43777632225315
2	CB_lnc_0006	0.90412517780939
3	CB_lnc_0010	0.74226804123711
4	CB_lnc_0011	0.47204641350211
5	CB_lnc_0012	0.92444963308873
6	CB_lnc_0013	0.98905584300795
7	CB_lnc_0014	0.34943538268507
8	CB_lnc_0015	0.9275515683735
9	CB_lnc_0018	0.97208524128214
10	CB_lnc_0032	0.4422619047619
11	CB_lnc_0038	0.46575342465753
12	CB_lnc_0039	0.12561174551387
13	CB_lnc_0040	0.7057761732852
14	CB_lnc_0043	0.87893291486858
15	CB_lnc_0045	0.43635170603675
16	CB_lnc_0048	0.54134725167183
17	CB_lnc_0054	0.58164414414414
18	CB_lnc_0062	0.52152641878669
19	CB_lnc_0063	0.5010101010101
20	CB_lnc_0065	0.18057663125948
21	CB_lnc_0066	0.69026104417671
22	CB_lnc_0071	0.46449976947902
23	CB_lnc_0072	0.60856864654333
24	CB_lnc_0073	0.44842406876791

## 5. Going back to home

Click at 'Home' to get back to home page

click here for the result file

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## References:

Yanai, I., Benjamin, H., Shmoish, M., Chalifa-Caspi, V., Shklar, M., Ophir, R. & Shmueli, O. (2005). Genome-wide midrange transcription profiles reveal expression level relationships in human tissue specification. *Bioinformatics*, 21(5), 650-659.