TCellSI: A novel method for T cell state assessment and its applications in immune environment prediction

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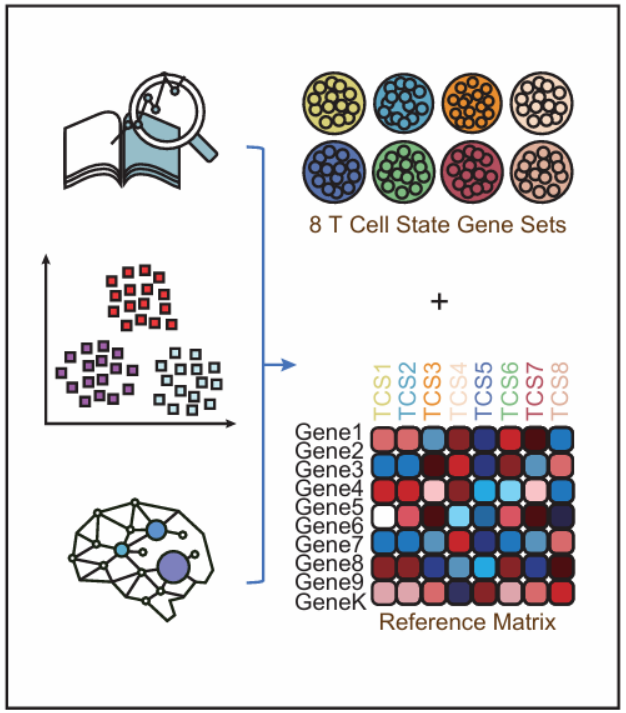
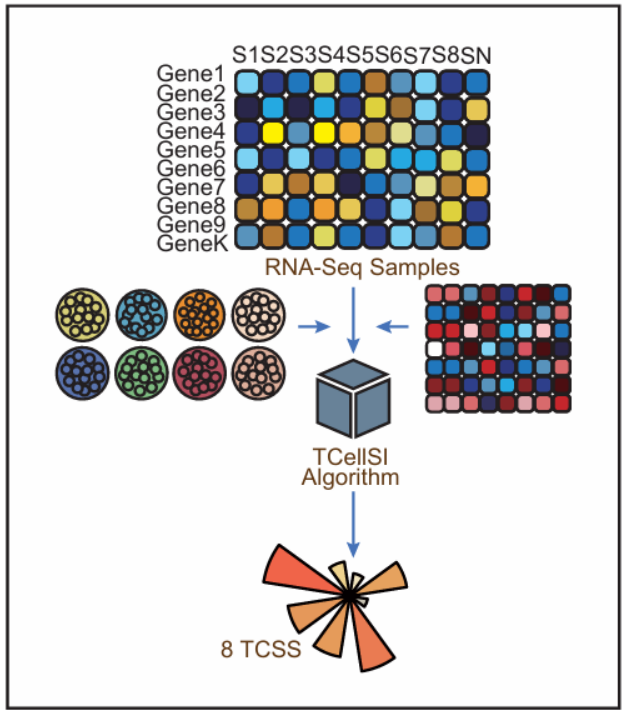
Introduction

The T cell state identifier (TCellSI) algorithm provides a comprehensive method for evaluating T cell states via transcriptome data. With specific marker gene sets and a compiled reference spectrum, TCellSI enables the calculation of T cell state scores (TCSS) metrics, representing the levels of eight distinct T cell states including quiescence, regulating, proliferation, helper, cytotoxicity, progenitor exhaustion, terminal exhaustion, and senescence.





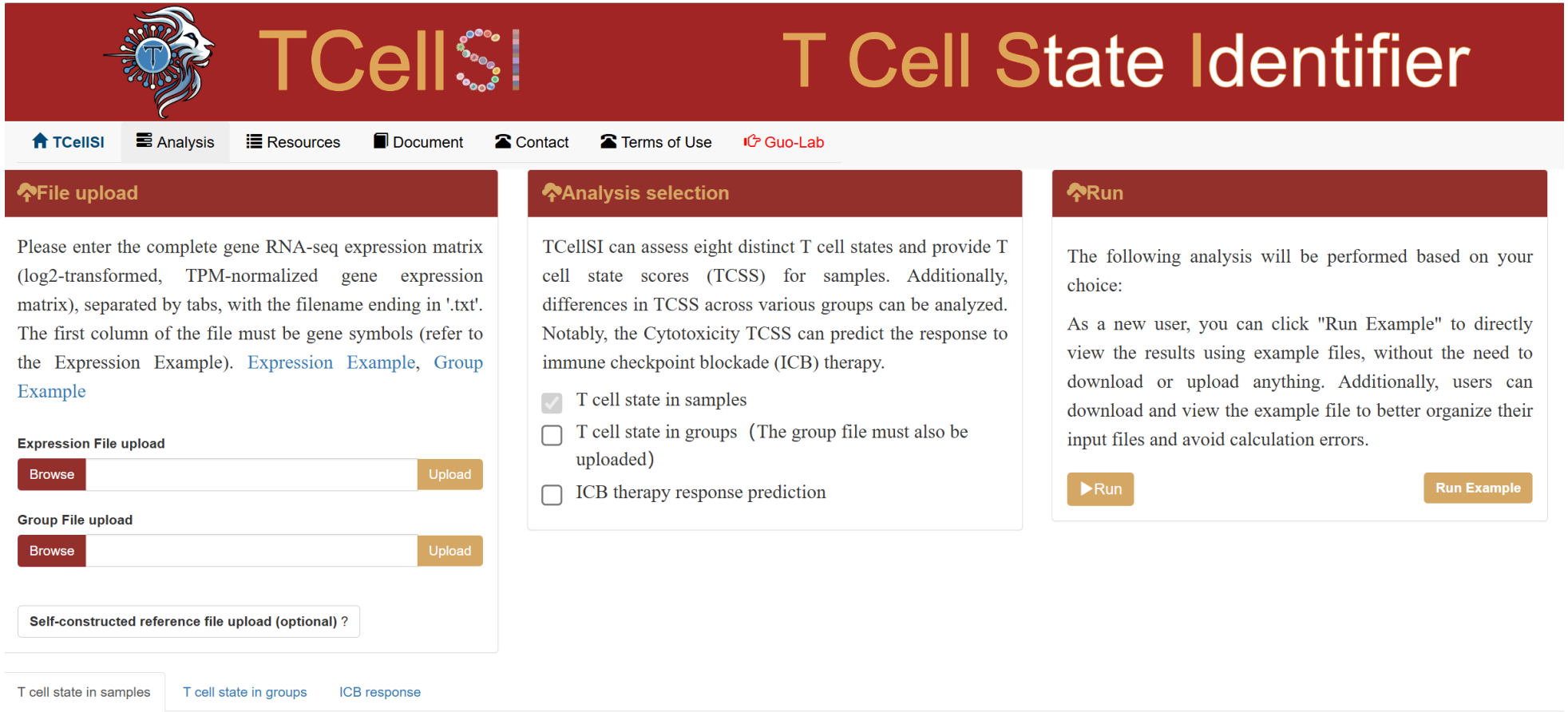
Highlights

- T cell state identifier (TCellSI) is a novel and accurate scoring tool that assesses eight T cell states from transcriptome data.
- TCellSI demonstrates predictive value in the immune environment, correlating T cell states with patient prognosis and responses to immunotherapy.
- TCellSI is accessible through a user-friendly R package and an online web server.

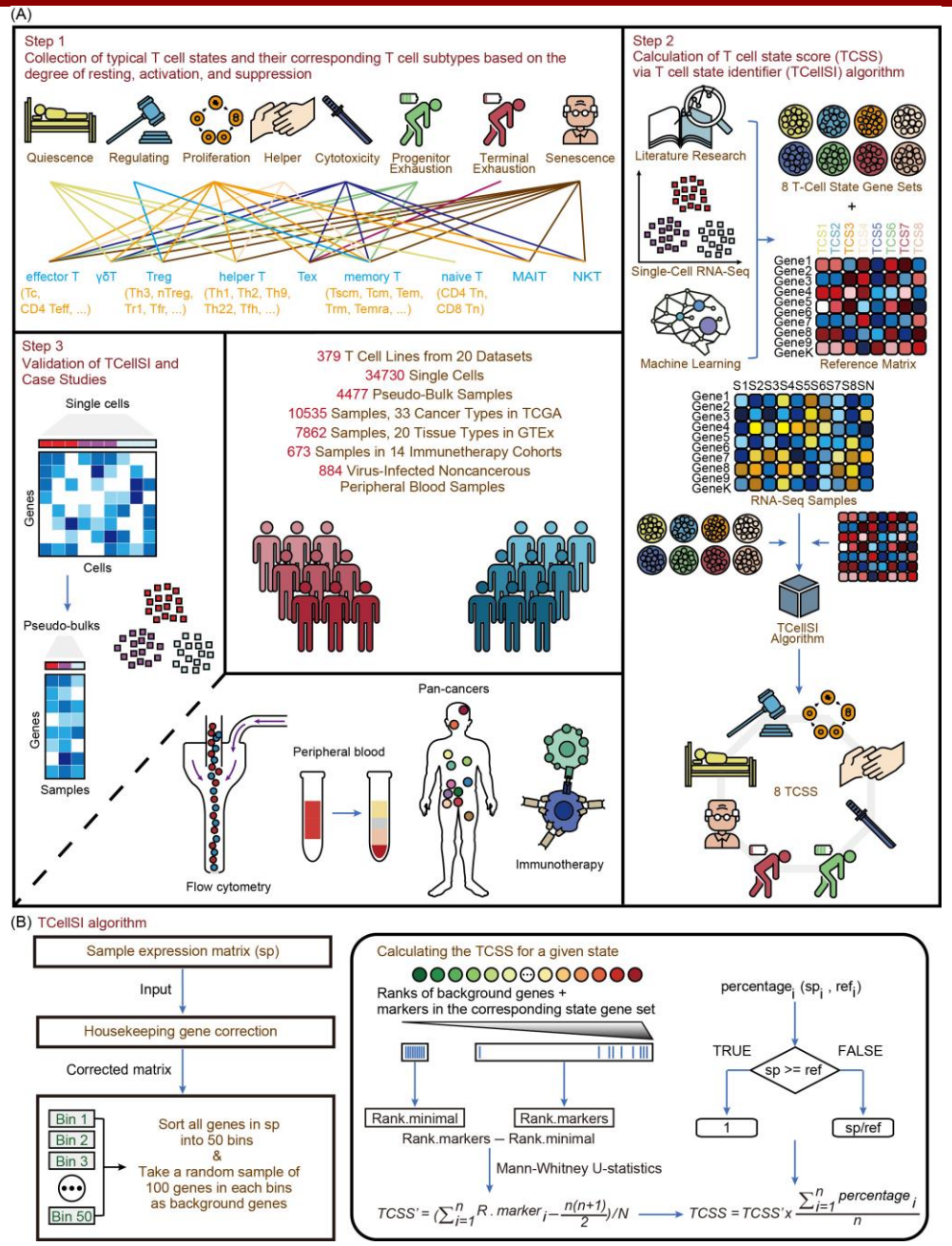
User-friendly Tool Interface

https://guolab.wchscu.cn/TCellSI/

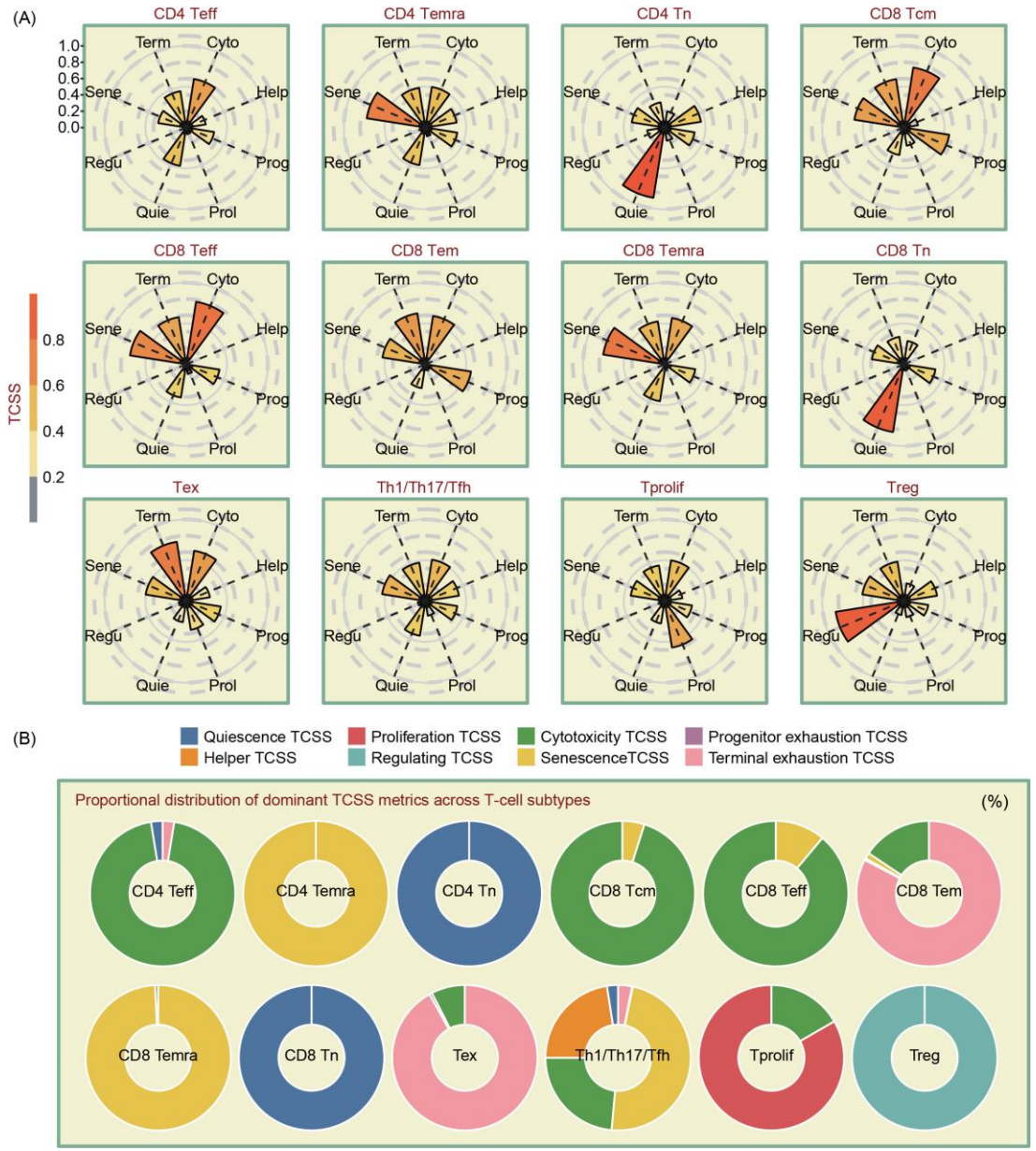
The use of TCellSI tools is designed to simplify and enhance the efficiency of analysis. Users can click Expression Example, Group Example to download and view the example files provided by the website. The only thing that must be prepared is the Expression File. Users can check different analysis options to analyze according to their needs.



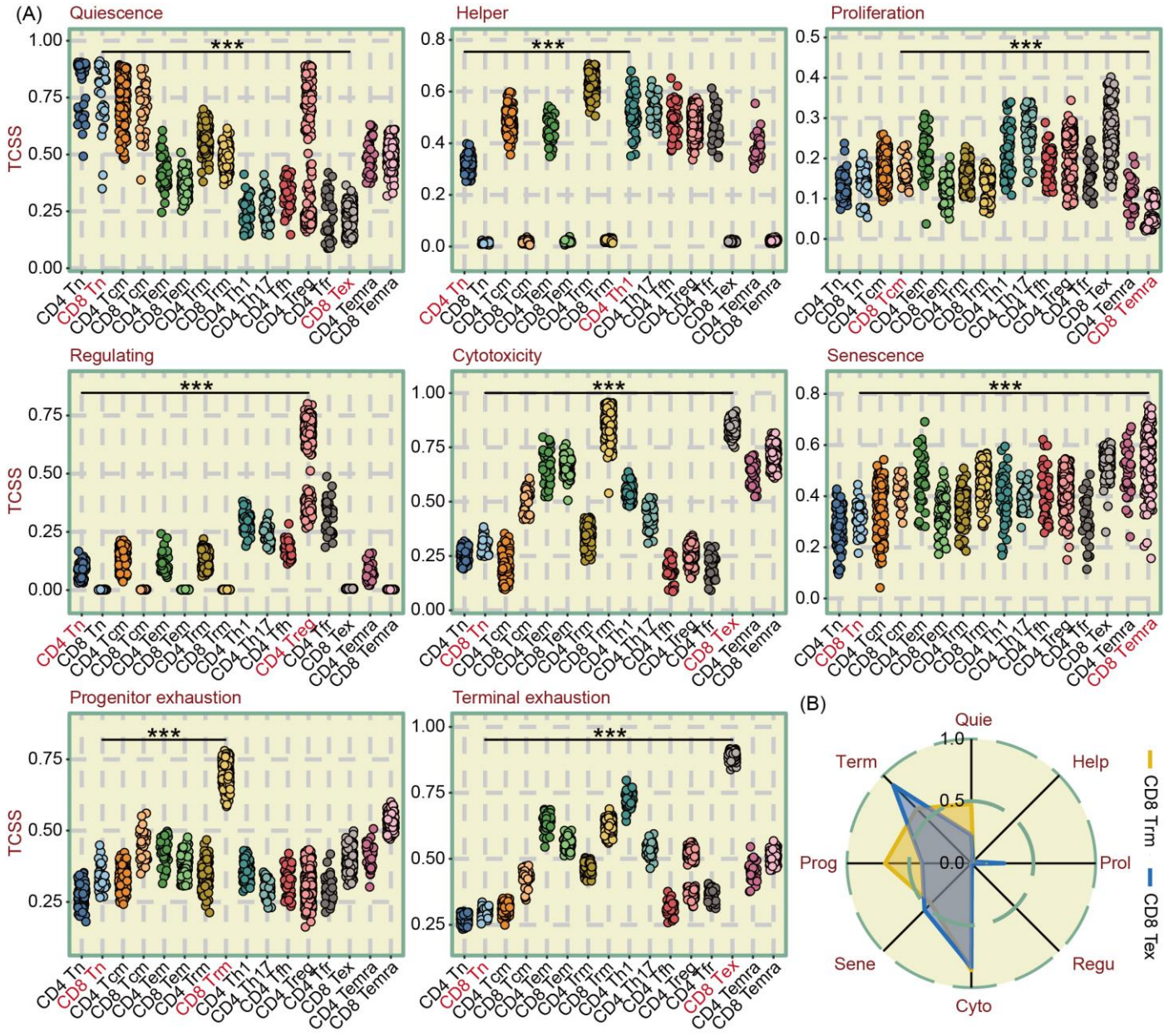
Research result 1- Overview of the TCellSI method



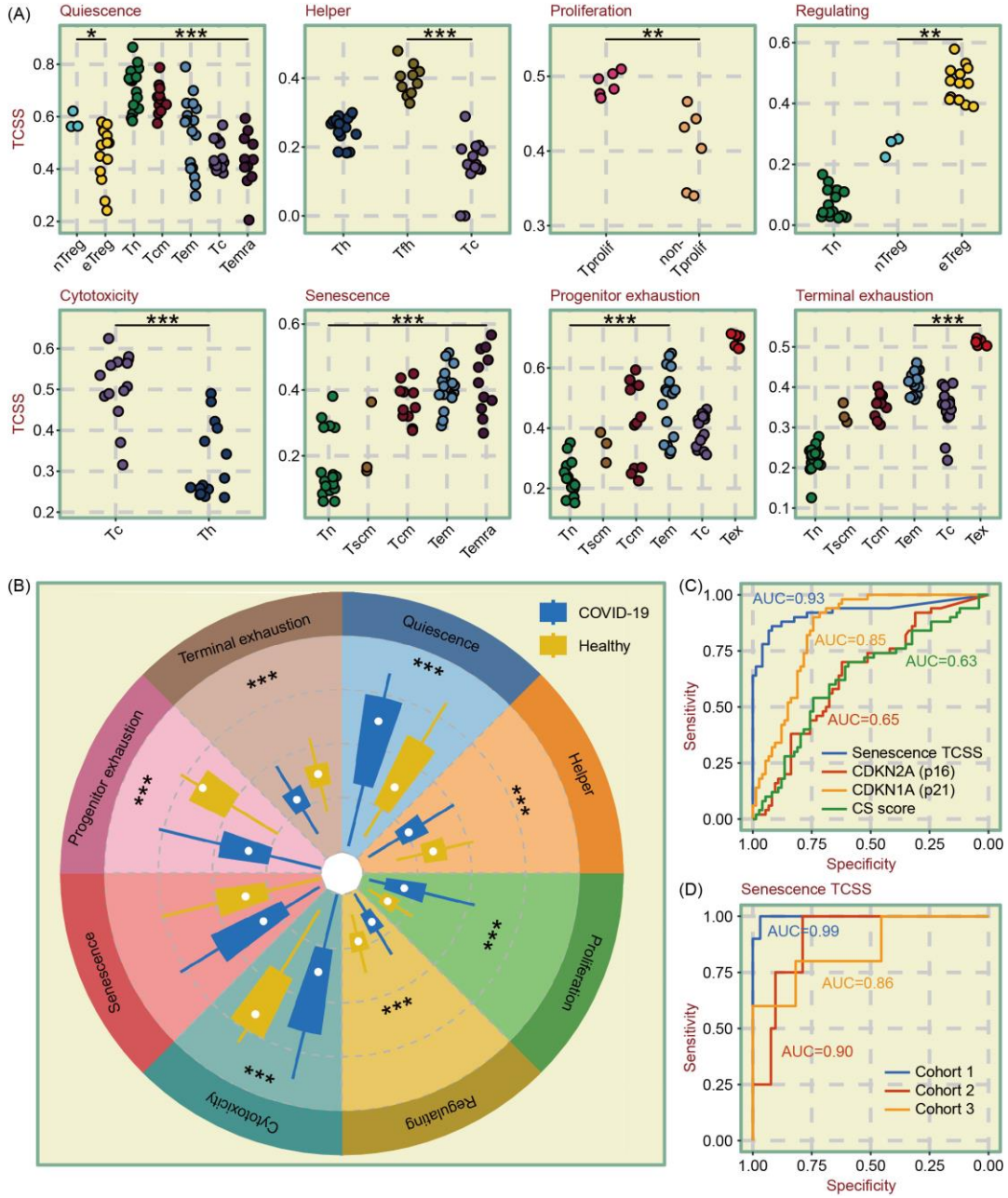
Research result 2- Evaluating TCellSI with simulated data generated by scRNA-seq data



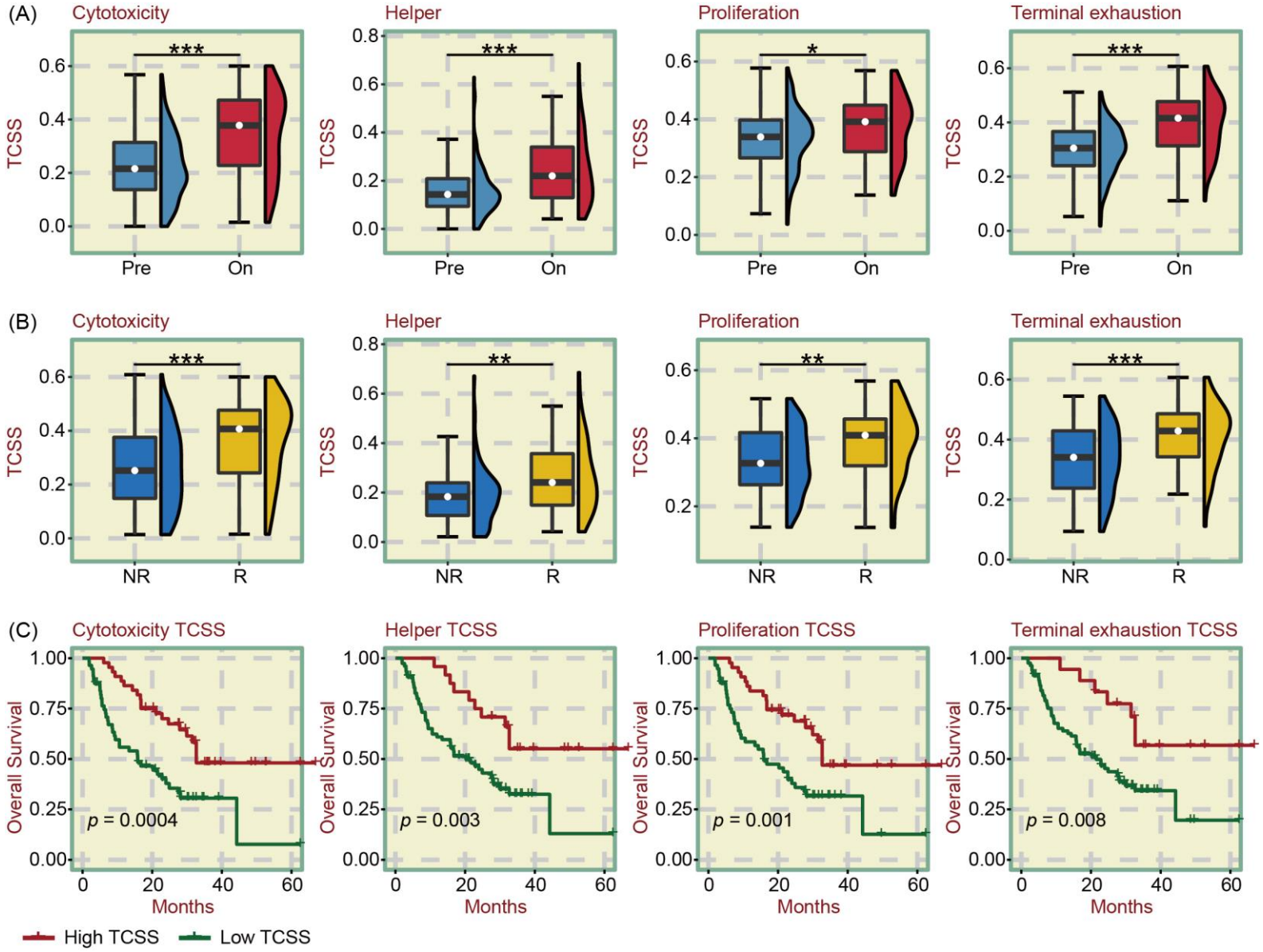
Research result 3- Assessing TCellSI with T cell pseudo-bulk samples.



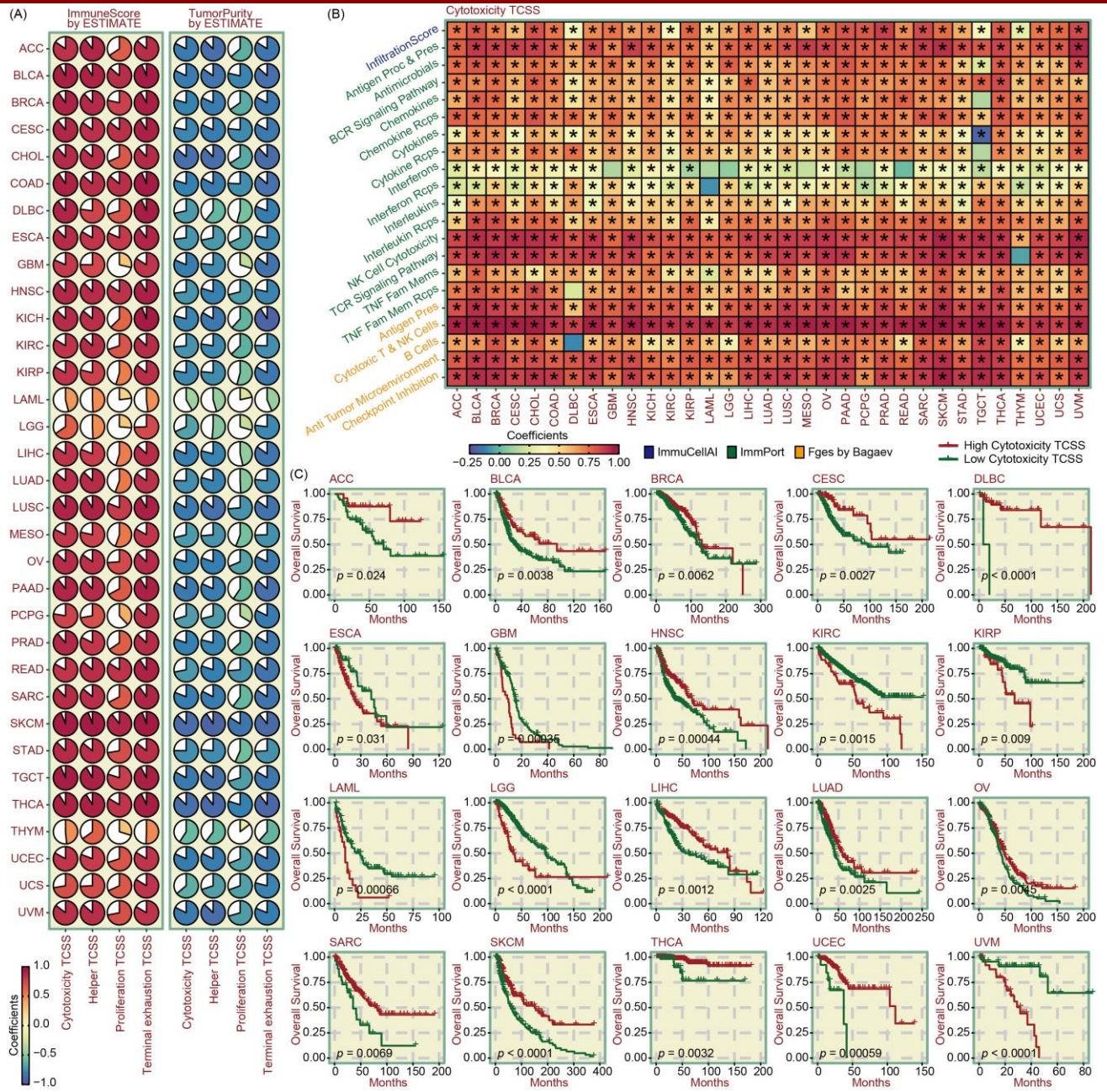
Research result 4- Validating TCellSI with bulk RNA-seq data across multiple categories of samples



Case 1: Influence of TCSS metrics on ICB therapy



Case 2: Immunological profiling and prognostic implications of TCSS in pan-cancer context



Summary

- In this study, we introduced TCellSI, a user-friendly platform for T cell analyses.
- Validated against sizeable pseudo-bulk and actual bulk RNA-seq data across a range of T cell types, TCellSI not only accurately characterizes T cell states but also surpasses existing well-discovered signatures in reflecting the nature of T cells.
- Significantly, the tool demonstrates predictive value in the immune environment, correlating T cell states with patient prognosis and responses to immunotherapy.
- Website: https://guolab.wchscu.cn/TCellSI/

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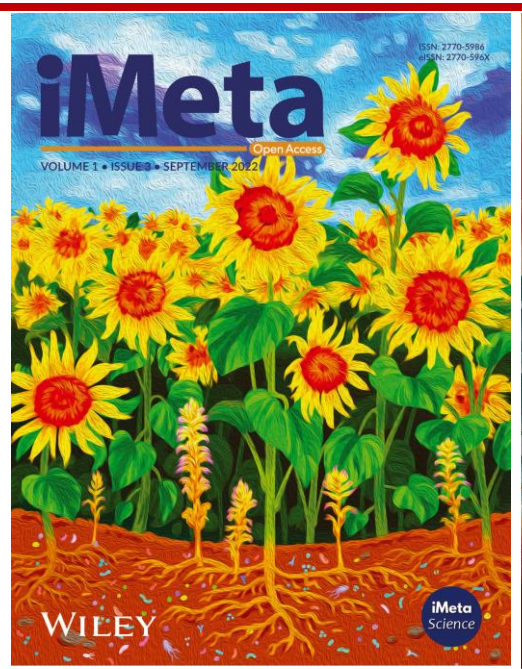

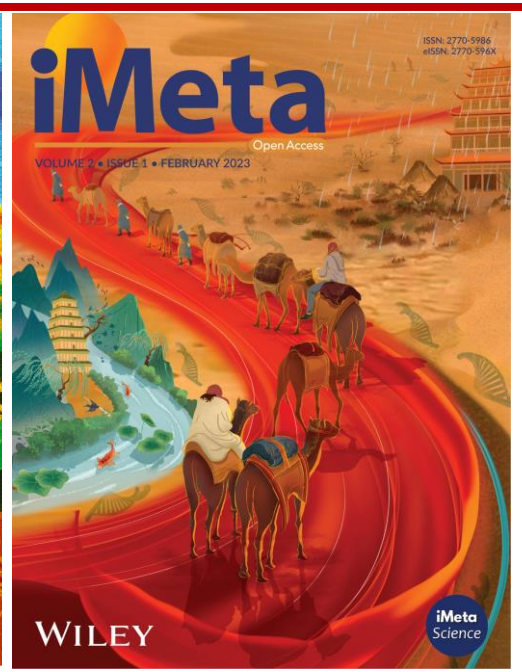

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