

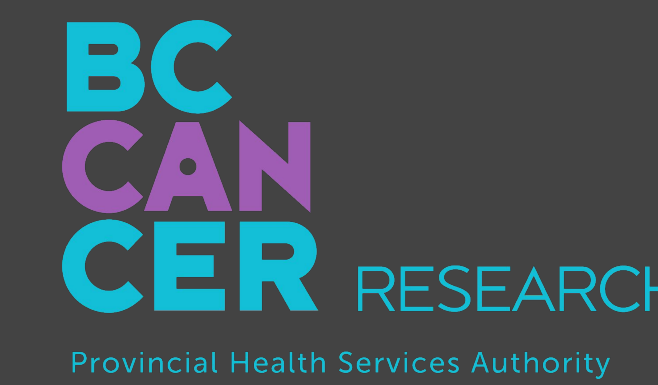
RNA-Scoop interactive visualization of isoforms in single-cell transcriptomes

Maria Stephenson^{1,2,#}, Ka Ming Nip^{1,2,#}, Saber Hafezqorani^{1,2}, Chen Yang^{1,2}, René L. Warren¹, İnanç Birol^{1,2}

¹ Canada's Michael Smith Genome Sciences Centre, BC Cancer, Vancouver, BC, Canada

² The University of British Columbia, Vancouver, BC, Canada

contributed equally in this work



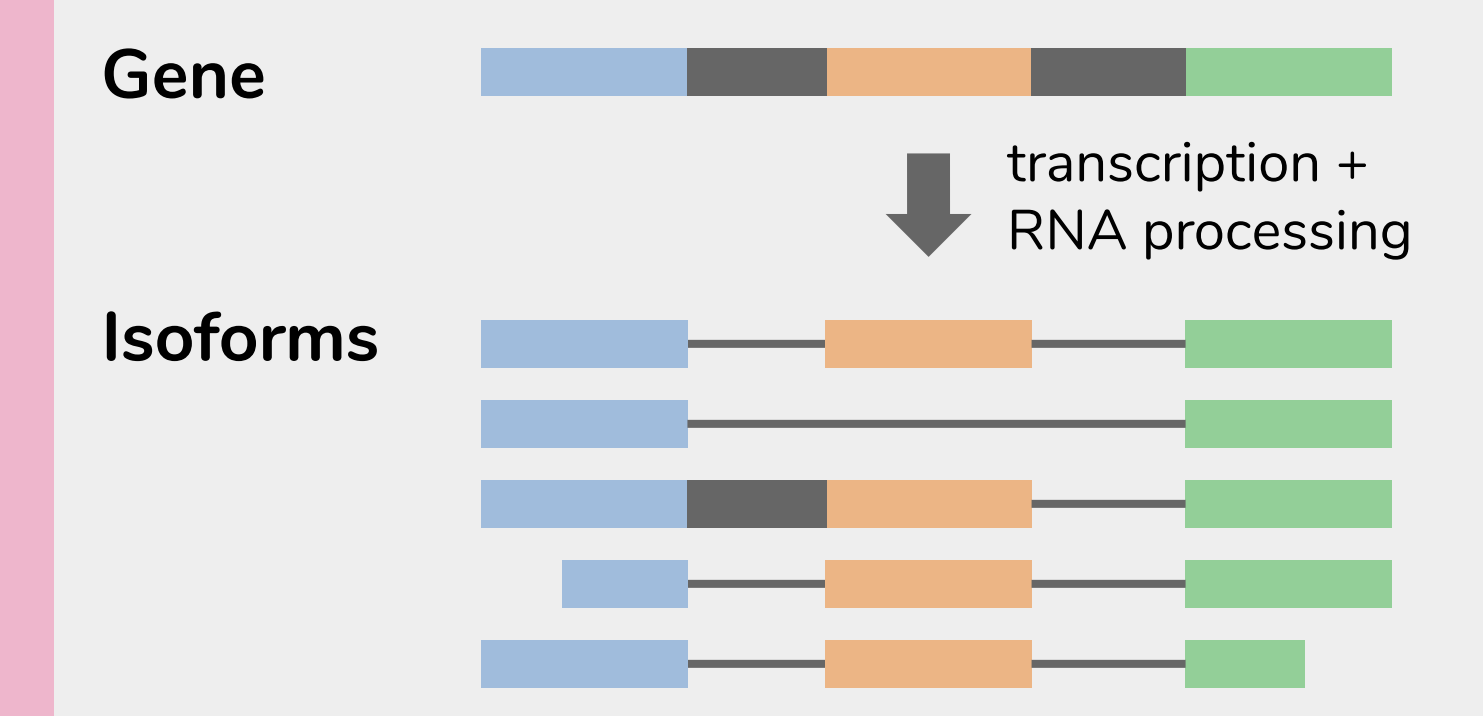
Background

Single-Cell RNA Sequencing

- Interrogation of transcriptome heterogeneity at the single-cell level
- Typical use: clustering of **gene expression** data from over thousands of cells

Transcript Isoforms

- Each gene may generate multiple transcript isoforms through alternative splicing events and alternative transcription start/termination sites

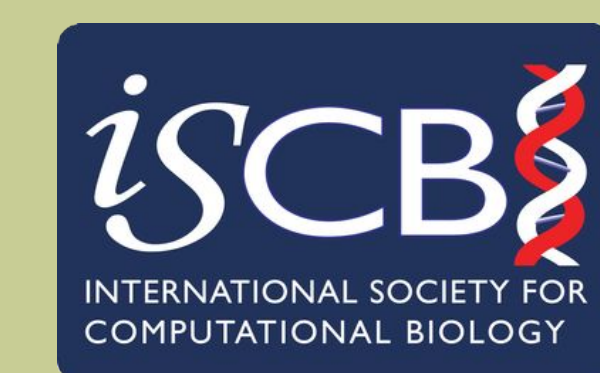


- A gene may have multiple functions
- **Studying isoforms is crucial to understanding the functionality of the genome**

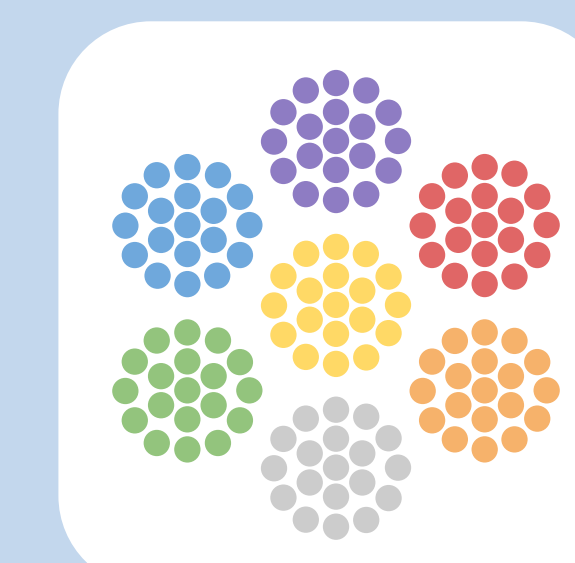
Summary

- Isoform detection and discovery in single cells are central to advancing our understanding of cell diversity
- Through use of an interactive t-SNE plot, RNA-Scoop allows users to easily explore isoforms in a single-cell transcriptome dataset of thousands of cells

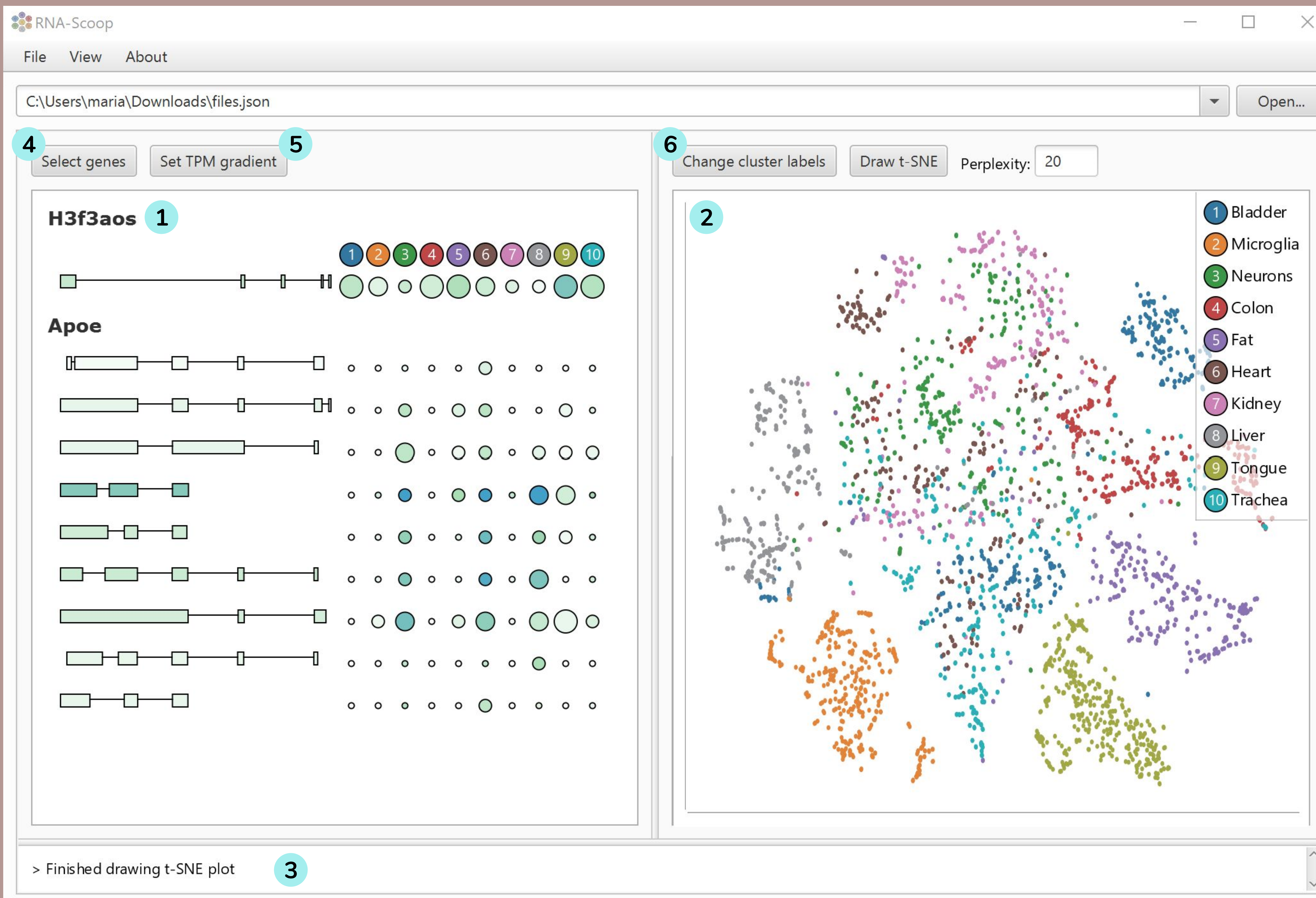
Funding



Github



github.com/bcgsc/RNA-Scoop



1 Isoform View

- Displays isoforms of selected genes
- Selecting isoforms highlights cells in which they are expressed
- Dot plot compares average expression between clusters
- Can reverse complement isoforms on (-) strand, hide single-exon isoforms, and display name and ID information

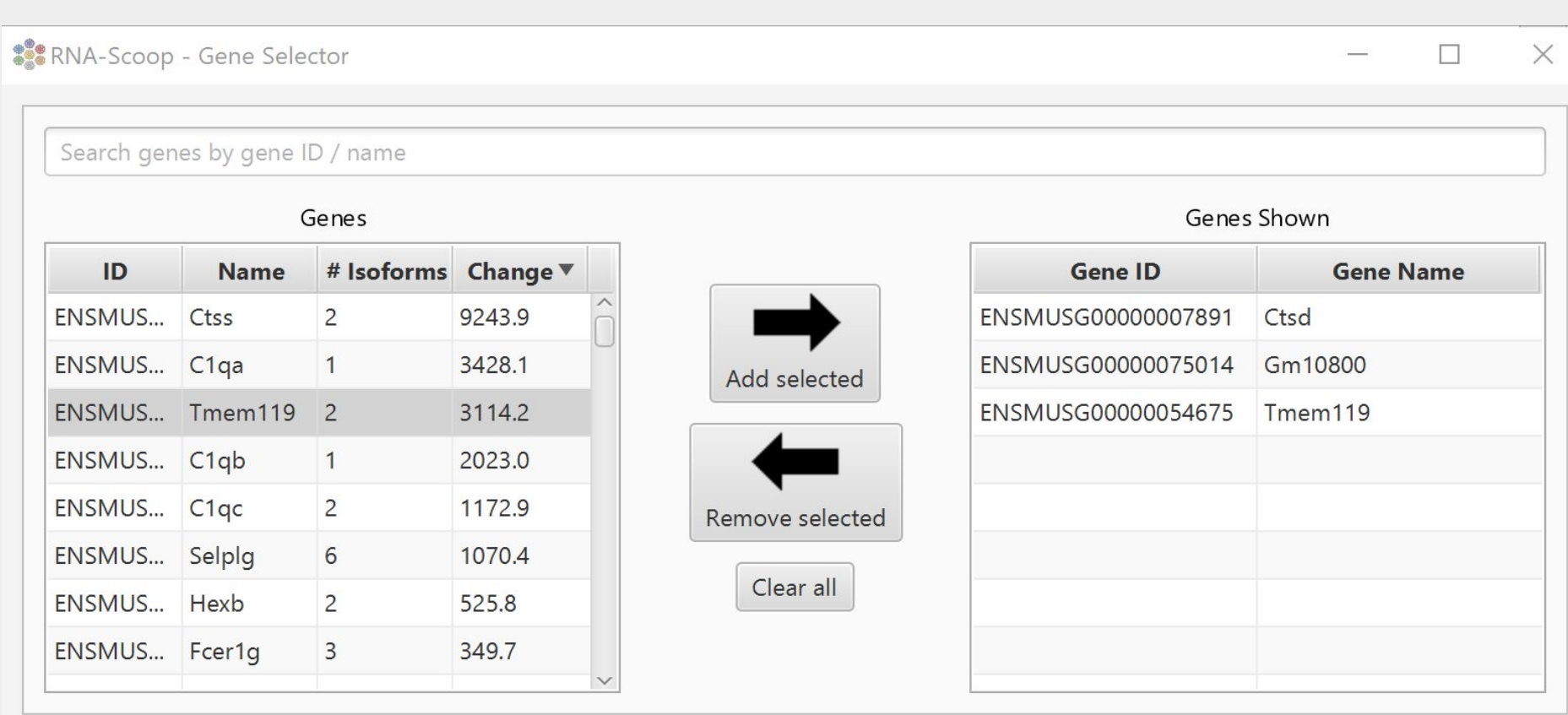
2 t-SNE Plot

- Lasso selection colors isoforms based on their expression levels in selected cells
- Users can zoom in and out of different areas, and pan the plot freely
- Supports multiple label sets

3 Console

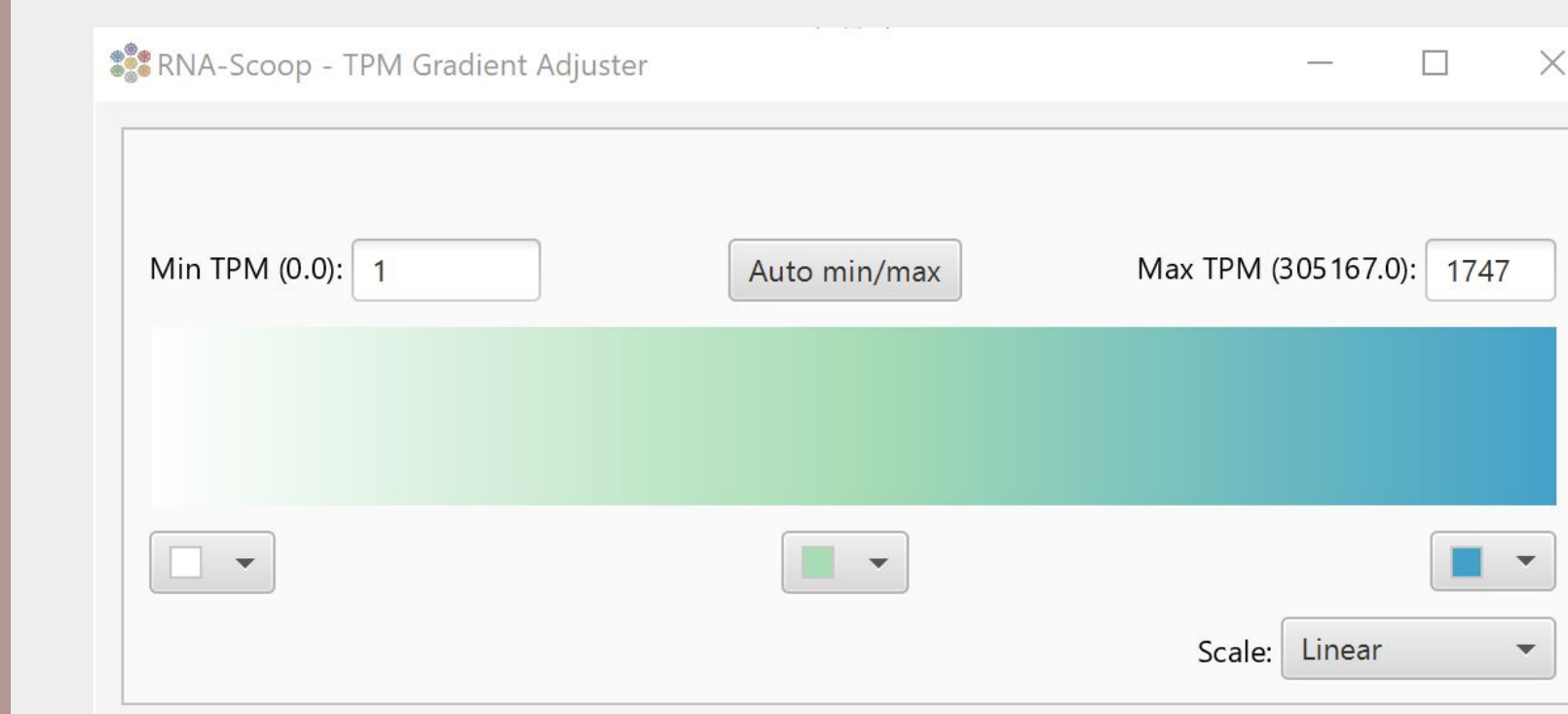
- Logs user activities

4 Gene Selector



- Select genes for Isoform View
- Genes are searchable by ID/name and they are sortable by ID, name, number of isoforms and fold-change of expression across clusters

5 TPM Gradient



- Color gradient for isoforms and dot plot
- Set TPM cut-offs and scale (i.e. linear or logarithmic)

6 Label Set Manager

- Allows users to switch and create cluster label sets
- New label sets are created via selection of cells in the t-SNE plot
- New label sets can be saved and used at any time