

# Package ‘chevreulPlot’

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**Type** Package

**Title** Plots used in the chevreulPlot package

**Version** 1.1.0

**Description** Tools for plotting SingleCellExperiment objects in the chevreulPlot package. Includes functions for analysis and visualization of single-cell data. Supported by NIH grants R01CA137124 and R01EY026661 to David Cobrinik.

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**URL** <https://github.com/whtns/chevreulPlot>,  
<https://whtns.github.io/chevreulPlot/>

**Date** 2024-11-17

**BugReports** <https://github.com/cobriniklab/chevreulPlot/issues>

**Depends** R (>= 4.5.0), SingleCellExperiment, chevreulProcess

**Imports** base, cluster, clustree, ComplexHeatmap (>= 2.5.4), circlize, dplyr, EnsDb.Hsapiens.v86, forcats, fs, ggplot2, grid, plotly, purrr, S4Vectors, scales, scater, scran, scuttle, stats, stringr, tibble, tidyr, utils, wiggleplotr (>= 1.13.1), tidyselect, patchwork

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chevreulPlot-package    *chevreulPlot: Plots used in the chevreulPlot package*

---

## Description

Tools for plotting SingleCellExperiment objects in the chevreulPlot package. Includes functions for analysis and visualization of single-cell data. Supported by NIH grants R01CA137124 and R01EY026661 to David Cobrinik.

## Author(s)

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**See Also**

Useful links:

- <https://github.com/whtns/chevreulPlot>
- <https://whtns.github.io/chevreulPlot/>
- Report bugs at <https://github.com/cobriniklab/chevreulPlot/issues>

cc.genes.cyclone

*Cyclone cell cycle pairs by symbol***Description**

cell cycle genes with paired expression represented by HGNC symbol

**Usage**

cc.genes.cyclone

**Format**

a list of dataframes with G1, G2, and S gene expression

**G1** G1 gene symbols**G2** G2 gene symbols**S** S gene symbols ...**Source**

cyclone

enframe\_markers

*Enframe Cluster Markers***Description**

Enframe Cluster Markers

**Usage**

enframe\_markers(tbl)

**Arguments**

tbl                    a tibble of marker genes

**Value**

a pivoted tibble of marker genes

---

ensembl_version	<i>Ensembl version used for build</i>
-----------------	---------------------------------------

---

**Description**

Ensembl version used for build

**Usage**

```
ensembl_version
```

**Format**

An object of class character of length 1.

**Source**

<http://www.ensembl.org/>

**Examples**

```
# ensembl_version
```

---

grch38	<i>Human annotation data</i>
--------	------------------------------

---

**Description**

Human (*Homo sapiens*) annotations based on genome assembly GRCH38 from Ensembl.

**Usage**

```
grch38
```

**Format**

An object of class `tbl_df` (inherits from `tbl`, `data.frame`) with 76062 rows and 9 columns.

**Details**

Variables:

- `ensgene`
- `entrez`
- `symbol`
- `chr`
- `start`
- `end`
- `strand`
- `biotype`
- `description`

**Source**

[http://ensembl.org/homo\\_sapiens](http://ensembl.org/homo_sapiens)

**Examples**

```
data("grch38")  
head(grch38)
```

---

grch38_tx2gene	<i>Human transcripts to genes</i>
----------------	-----------------------------------

---

**Description**

Lookup table for converting Human (*Homo sapiens*) Ensembl transcript IDs to gene IDs based on genome assembly GRCH38 from Ensembl.

**Usage**

```
grch38_tx2gene
```

**Format**

An object of class `tbl_df` (inherits from `tbl`, `data.frame`) with 277081 rows and 2 columns.

**Details**

Variables:

- `enstxp`
- `ensgene`

**Source**

[http://ensembl.org/homo\\_sapiens](http://ensembl.org/homo_sapiens)

**Examples**

```
data(grch38_tx2gene)  
head(grch38_tx2gene)
```

---

human\_to\_mouse\_homologs

*Gene Homologs Between Human and Mouse*

---

### Description

Homologs drawn from Biomart

### Usage

```
human_to_mouse_homologs
```

### Format

A data frame with 23188 rows and 2 columns

**HGNC.symbol** human gene symbols

**MGI.symbol** mouse gene symbols ...

### Source

bioMart

---

make\_complex\_heatmap *Plot Annotated Complexheatmap from SingleCellExperiment object*

---

### Description

Plot Annotated Complexheatmap from SingleCellExperiment object

### Usage

```
make_complex_heatmap(  
  object,  
  features = NULL,  
  group.by = "ident",  
  cells = NULL,  
  assayName = "logcounts",  
  experiment = NULL,  
  group.bar.height = 0.01,  
  column_split = NULL,  
  col_arrangement = "ward.D2",  
  mm_col_dend = 30,  
  ...  
)
```

**Arguments**

object	A SingleCellExperiment object
features	Vector of features to plot. Features can come
group.by	Name of one or more metadata columns to annotate columns by (for example, orig.ident)
cells	Cells to retain
assayName	"counts" for raw data "scale.data" for log-normalized data
experiment	experiment to display
group.bar.height	height for group bars
column_split	whether to split columns by metadata value
col_arrangement	how to arrange columns whether with a dendrogram (Ward.D2, average, etc.) or exclusively by metadata category
mm_col_dend	height of column dendrogram
...	additional arguments passed to Heatmap

**Value**

a complexheatmap

**Examples**

```
data("tiny_sce")
make_complex_heatmap(tiny_sce)
```

---

plotly_settings	<i>Plotly settings</i>
-----------------	------------------------

---

**Description**

Change settings of a plotly plot

**Usage**

```
plotly_settings(plotly_plot, width = 600, height = 700)
```

**Arguments**

plotly_plot	A plotly plot
width	Default set to '600'
height	Default set to '700'

**Value**

a plotly plot with altered settings

---

plot\_all\_transcripts *Plot All Transcripts*

---

### Description

plot expression all transcripts for an input gene superimposed on embedding

### Usage

```
plot_all_transcripts(
  object,
  features,
  embedding = "UMAP",
  from_gene = TRUE,
  ...
)
```

### Arguments

object	A object
features	gene or vector of transcripts
embedding	umap
from_gene	whether to look up transcripts for an input gene
...	additional arguments passed to plot_feature_on_embedding

### Value

a list of embedding plots colored by a feature of interest

### Examples

```
data("tiny_sce")
plot_all_transcripts(tiny_sce, "NRL", from_gene = TRUE)
```

---

plot\_colData\_histogram

*Plot Read Count*

---

### Description

Draw a box plot for read count data of a metadata variable

### Usage

```
plot_colData_histogram(
  object,
  group_by = NULL,
  fill_by = NULL,
  yscale = "linear",
  return_plotly = FALSE
)
```



**Arguments**

object	A object
group_by	Metadata variable to plot. Default set to "nCount_RNA"
fill_by	Variable to color bins by. Default set to "batch"
yscale	Scale of y axis. Default set to "linear"
return_plotly	whether to return an interactive plotly plot

**Value**

a histogram of read counts

**Examples**

```
data(small_example_dataset)
small_example_dataset <- sce_calcn(small_example_dataset)
# static plot
plot_colData_histogram((small_example_dataset), return_plotly = FALSE)
```

---

plot\_colData\_on\_embedding

*Plot Metadata Variables*

---

**Description**

Plots static or interactive plot where each point represents a cell metadata variable whose position on the map depends on cell embeddings determined by the reduction technique used

**Usage**

```
plot_colData_on_embedding(
  object,
  group = "batch",
  embedding = "UMAP",
  dims = c(1, 2),
  highlight = NULL,
  return_plotly = FALSE,
  ...
)
```

**Arguments**

object	A SingleCellExperiment object
group	Name of one or more metadata columns to group (color) cells by
embedding	The dimensional reduction technique to be used
dims	Dimensions to plot, must be a two-length numeric vector
highlight	A list of vectors of cells to highlight
return_plotly	Convert plot to interactive web-based graph
...	extra parameters passed to ggplot

**Value**

a ggplot

**Examples**

```
data(small_example_dataset)

# static mode
plot_colData_on_embedding(small_example_dataset, "Mutation_Status", return_plotly = FALSE)
```

---

plot\_feature\_on\_embedding  
*Plot Feature*

---

**Description**

Plots gene or transcript expression overlaid on a given embedding.

**Usage**

```
plot_feature_on_embedding(
  object,
  embedding = c("UMAP", "PCA", "TSNE"),
  features,
  dims = c(1, 2),
  return_plotly = FALSE,
  ...
)
```

**Arguments**

object	A SingleCellExperiment object
embedding	Dimensional reduction technique to be used
features	Feature to plot
dims	Dimensions to plot, must be a two-length numeric vector
return_plotly	return plotly object
...	additional arguments passed to plotReduceDim

**Value**

an embedding colored by a feature of interest

**Examples**

```
data(small_example_dataset)
plot_feature_on_embedding(small_example_dataset, embedding = "UMAP",
  features = "Gene_0001")
```

---

plot\_gene\_coverage\_by\_var

*Plot BigWig Coverage for Genes of Interest by a Given Variable*


---

## Description

Plot BigWig coverage for genes of interest colored by a given variable

## Usage

```
plot_gene_coverage_by_var(
  genes_of_interest = "NRL",
  cell_metadata,
  bigwig_tbl,
  group_by = "batch",
  values_of_interest = NULL,
  organism = c("human", "mouse"),
  edb = NULL,
  heights = c(3, 1),
  scale_y = "log10",
  reverse_x = FALSE,
  start = NULL,
  end = NULL,
  summarize_transcripts = FALSE,
  ...
)
```

## Arguments

genes_of_interest	Gene of interest
cell_metadata	a dataframe with cell metadata from object
bigwig_tbl	a tibble with colnames "name", "bigWig", and "sample_id" matching the file-name, absolute path, and sample name of each cell in the cell_metadata
group_by	Variable to color by
values_of_interest	values of interest
organism	human (default) or mouse
edb	ensemldb object
heights	The heights of each row in the grid of plot
scale_y	whether to scale coverage
reverse_x	whether to reverse x axis
start	start coordinates
end	end coordinates
summarize_transcripts	whether to summarize transcript counts
...	extra arguments passed to plotCoverageFromEnsemblDb

**Value**

a ggplot with coverage faceted by group\_by

---

plot\_marker\_features *Plot Cluster Marker Genes*

---

**Description**

Plot a dot plot of n marker features grouped by cell metadata available methods are wilcoxon rank-sum test

**Usage**

```
plot_marker_features(
  object,
  group_by = "batch",
  num_markers = 5,
  selected_values = NULL,
  return_plotly = FALSE,
  marker_method = "wilcox",
  experiment = "gene",
  hide_technical = NULL,
  unique_markers = FALSE,
  p_val_cutoff = 1,
  ...
)
```

**Arguments**

object	a object
group_by	the metadata variable from which to pick clusters
num_markers	default is 5
selected_values	selected values to display
return_plotly	whether to return an interactive plotly plot
marker_method	"wilcox"
experiment	experiment to plot default gene
hide_technical	whether to exclude mitochondrial or ribosomal genes
unique_markers	whether to plot only unique marker genes for group
p_val_cutoff	cutoff for p value display
...	extra parameters passed to ggplot2

**Value**

a ggplot with marker genes from group\_by

**Examples**

```
data(small_example_dataset)
plot_marker_features(small_example_dataset, group_by = "gene_snn_res.1")
```

---

plot\_transcript\_composition  
*Plot Transcript Composition*

---

### Description

plot the proportion of reads of a given gene map to each transcript

### Usage

```
plot_transcript_composition(  
  object,  
  gene_symbol,  
  group.by = "batch",  
  standardize = FALSE,  
  drop_zero = FALSE  
)
```

### Arguments

object	A object
gene_symbol	Gene symbol of gene of interest
group.by	Name of one or more metadata columns to annotate columns by (for example, orig.ident)
standardize	whether to standardize values
drop_zero	Drop zero values

### Value

a stacked barplot of transcript counts

### Examples

```
data(tiny_sce)  
plot_transcript_composition(tiny_sce, "NRL")
```

---

plot\_violin *Plot Violin plot*

---

### Description

Plots a Violin plot of a single data (gene expression, metrics, etc.) grouped by a metadata variable

**Usage**

```
plot_violin(
  object,
  group_by = "batch",
  plot_vals = NULL,
  features = "NRL",
  experiment = "gene",
  ...
)
```

**Arguments**

object	A SingleCellExperiment object
group_by	Variable to group (color) cells by
plot_vals	plot values
features	Features to plot
experiment	Name of experiment to use, defaults to active experiment
...	extra parameters passed to ggplot2

**Value**

a violin plot

**Examples**

```
data("tiny_sce")
plot_violin(tiny_sce, "Prep.Method", features = "NRL")
```

---

small\_example\_dataset *Small example SingleCellExperiment*

---

**Description**

created with scuttle::mockSCE

**Usage**

```
small_example_dataset
```

**Format**

An SCE with 200 cells and 1000 genes

**Source**

scuttle::mockSCE

---

`tiny_sce`*Tiny example SingleCellExperiment*

---

**Description**

subset to only NRL from `chevreuldata::human_gene_transcript_sce()`

**Usage**

```
tiny_sce
```

**Format**

An SCE with only expression of NRL gene and NRL transcripts

**Source**

```
chevreuldata::human_gene_transcript_sce()
```

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