

# Package ‘psychomics’

February 19, 2019

**Title** Graphical Interface for Alternative Splicing Quantification,  
Analysis and Visualisation

**Version** 1.8.1

**Encoding** UTF-8

**Description** Interactive R package with an intuitive Shiny-based graphical interface for alternative splicing quantification and integrative analyses of alternative splicing and gene expression based on The Cancer Genome Atlas (TCGA), the Genotype-Tissue Expression project (GTEx), Sequence Read Archive (SRA) and user-provided data. The tool interactively performs survival, dimensionality reduction and median- and variance-based differential splicing and gene expression analyses that benefit from the incorporation of clinical and molecular sample-associated features (such as tumour stage or survival). Interactive visual access to genomic mapping and functional annotation of selected alternative splicing events is also included.

**Depends** R (>= 3.5), shiny (>= 1.0.3), shinyBS

**License** MIT + file LICENSE

**LazyData** true

**RoxygenNote** 6.1.0

**Imports** AnnotationHub, cluster, colourpicker, data.table, digest, dplyr, DT (>= 0.2), edgeR, fastICA, fastmatch, ggplot2, ggrepel, grDevices, highcharter (>= 0.5.0), htmltools, httr, jsonlite, limma, miscTools, pairsD3, plyr, Rcpp (>= 0.12.14), recount, R.utils, shinyjs, stringr, stats, SummarizedExperiment, survival, tools, utils, XML, xtable, methods

**Suggests** testthat, knitr, parallel, devtools, rmarkdown, gplots, covr, car, rstudioapi

**LinkingTo** Rcpp

**VignetteBuilder** knitr

**Collate** 'RcppExports.R' 'utils.R' 'globalAccess.R' 'app.R'  
'analysis.R' 'analysis\_correlation.R'  
'analysis\_diffExpression.R' 'analysis\_diffExpression\_event.R'  
'analysis\_diffExpression\_table.R' 'analysis\_diffSplicing.R'  
'analysis\_diffSplicing\_event.R' 'analysis\_diffSplicing\_table.R'  
'analysis\_dimReduction.R' 'analysis\_dimReduction\_ica.R'  
'analysis\_dimReduction\_pca.R' 'analysis\_information.R'

'analysis\_survival.R' 'analysis\_template.R' 'data.R'  
 'formats.R' 'data\_firebrowse.R'  
 'data\_geNormalisationFiltering.R' 'data\_gtex.R'  
 'data\_inclusionLevels.R' 'data\_local.R' 'data\_recount.R'  
 'events\_suppa.R' 'events\_vastTools.R' 'events\_miso.R'  
 'events\_mats.R' 'events.R' 'formats\_firebrowseGeneExpression.R'  
 'formats\_firebrowseJunctionReads.R'  
 'formats\_firebrowseMergeClinical.R'  
 'formats\_firebrowseNormalizedGeneExpression.R'  
 'formats\_genericClinical.R' 'formats\_genericGeneExpression.R'  
 'formats\_genericInclusionLevels.R'  
 'formats\_genericJunctionReads.R' 'formats\_genericSampleInfo.R'  
 'formats\_gtexClinical.R' 'formats\_gtexGeneReadsFormat.R'  
 'formats\_gtexJunctionReads.R' 'formats\_gtexSampleInfo.R'  
 'formats\_gtexV7Clinical.R' 'formats\_gtexV7JunctionReads.R'  
 'formats\_psichomicsGeneExpression.R'  
 'formats\_psichomicsInclusionLevels.R'  
 'formats\_recountSampleInfo.R' 'groups.R' 'help.R'

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 GeneExpression, DifferentialExpression

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---

addObjectAttrs	<i>Set attributes to an object</i>
----------------	------------------------------------

---

**Description**

Set attributes to an object

**Usage**

```
addObjectAttrs(object, ...)
```

**Arguments**

object	Object
...	Named parameters to convert to attributes

**Value**

Object with attributes set

**Examples**

```
ll <- list(a="hey", b="there")  
psychomics:::addObjectAttrs(ll, "words"=2, "language"="English")
```

---

addTCGAdata	<i>Creates a UI set with options to add data from TCGA/Firebrowse</i>
-------------	-----------------------------------------------------------------------

---

**Description**

Creates a UI set with options to add data from TCGA/Firebrowse

**Usage**

```
addTCGAdata(ns)
```

**Arguments**

ns	Namespace function
----	--------------------

**Value**

A UI set that can be added to a UI definition



---

analysesPlotSet      *Set of functions to plot differential analyses*

---

**Description**

Instructions to build the Shiny app

**Usage**

```
analysesPlotSet(session, input, output, analysesType, analysesID,  
  getAnalysesData, getAnalysesFiltered, getAnalysesSurvival)
```

**Arguments**

session	Session object
input	Input object
output	Output object
analysesType	Character: type of analyses (GE or PSI)
analysesID	Character: identifier of analyses
getAnalysesData	Function: used to get analyses data
getAnalysesFiltered	Function: used to get filtered analyses data
getAnalysesSurvival	Function: used to get survival data

**Value**

NULL (this function is used to modify the Shiny session's state)

---

analysesTableSet      *Set of functions to render data table for differential analyses*

---

**Description**

Instructions to build the Shiny app

**Usage**

```
analysesTableSet(session, input, output, analysesType, analysesID,  
  getAnalysesData, getAnalysesFiltered, setAnalysesFiltered,  
  getAnalysesSurvival, getAnalysesColumns, setAnalysesColumns,  
  getResetPaging, setResetPaging)
```

**Arguments**

session	Session object
input	Input object
output	Output object
analysesType	Character: type of analyses (GE or PSI)
analysesID	Character: identifier of analyses
getAnalysesData	Function: used to get analyses data
getAnalysesFiltered	Function: used to get filtered analyses data
setAnalysesFiltered	Function: used to set filtered analyses data
getAnalysesSurvival	Function: used to get survival data
getAnalysesColumns	Function: used to get columns
setAnalysesColumns	Function: used to set columns
getResetPaging	Function: used to get reset paging toggle
setResetPaging	Function: used to set reset paging toggle

**Value**

NULL (this function is used to modify the Shiny session's state)

---

appendNewGroups	<i>Append new groups to already existing groups</i>
-----------------	-----------------------------------------------------

---

**Description**

Retrieve previous groups, rename duplicated group names in the new groups and append new groups to the previous ones

**Usage**

```
appendNewGroups(type, new, clearOld = FALSE)
```

**Arguments**

type	Character: type of groups (either "Patients", "Samples", "ASevents" or "Genes")
new	Rows of groups to be added
clearOld	Boolean: clear old groups?

**Value**

NULL (this function is used to modify the Shiny session's state)

---

appServer

*Server logic*

---

### **Description**

Instructions to build the Shiny app

### **Usage**

appServer(input, output, session)

analysesServer(input, output, session)

correlationServer(input, output, session)

diffExpressionServer(input, output, session)

diffExpressionEventServer(input, output, session)

diffExpressionTableServer(input, output, session)

diffSplicingServer(input, output, session)

diffSplicingEventServer(input, output, session)

diffSplicingTableServer(input, output, session)

dimReductionServer(input, output, session)

icaServer(input, output, session)

pcaServer(input, output, session)

infoServer(input, output, session)

survivalServer(input, output, session)

templateServer(input, output, session)

dataServer(input, output, session)

firebrowseServer(input, output, session)

geNormalisationFilteringServer(input, output, session)

gtexDataServer(input, output, session)

inclusionLevelsServer(input, output, session)

localDataServer(input, output, session)

```
recountDataServer(input, output, session)
```

```
groupsServer(input, output, session)
```

```
helpServer(input, output, session)
```

### Arguments

input	Input object
output	Output object
session	Session object

### Value

NULL (this function is used to modify the Shiny session's state)

---

appUI

*User interface*

---

### Description

The user interface (UI) controls the layout and appearance of the app. All CSS modifications are in the file shiny/www/styles.css

### Usage

```
appUI()
```

```
analysesUI(id, tab)
```

```
correlationUI(id)
```

```
diffExpressionUI(id, tab)
```

```
diffExpressionEventUI(id)
```

```
diffExpressionTableUI(id)
```

```
diffSplicingUI(id, tab)
```

```
diffSplicingEventUI(id)
```

```
diffSplicingTableUI(id)
```

```
dimReductionUI(id, tab)
```

```
icaUI(id)
```

```
pcaUI(id)
```

```
infoUI(id)
```

survivalUI(id)  
 templateUI(id)  
 dataUI(id, tab)  
 firebrowseUI(id, panel)  
 geNormalisationFilteringUI(id, panel)  
 gtexDataUI(id, panel)  
 inclusionLevelsUI(id, panel)  
 localDataUI(id, panel)  
 recountDataUI(id, panel)  
 groupsUI(id, tab)  
 helpUI(id, tab)

**Arguments**

id	Character: identifier
tab	Function to process HTML elements
panel	Function to enclose interface

**Value**

HTML elements

---

areSplicingEvents	<i>Check if string identifies splicing events</i>
-------------------	---------------------------------------------------

---

**Description**

Check if string identifies splicing events

**Usage**

```
areSplicingEvents(char, num = 6)
```

**Arguments**

char	Character vector
num	Integer: number of elements to check

**Value**

TRUE if first elements of the vector identify splicing events; FALSE, otherwise

---

articleUI	<i>Return the interface to display an article</i>
-----------	---------------------------------------------------

---

**Description**

Return the interface to display an article

**Usage**

```
articleUI(article)
```

**Arguments**

article	PubMed article
---------	----------------

**Value**

HTML to render an article's interface

---

ASquantFileInput	<i>File input for alternative splicing quantification</i>
------------------	-----------------------------------------------------------

---

**Description**

File input for alternative splicing quantification

**Usage**

```
ASquantFileInput(ASquantFileId, speciesId, assemblyId)
```

**Arguments**

ASquantFileId	Character: identifier for alternative splicing quantification input
speciesId	Character: identifier for species selection input
assemblyId	Character: identifier for genome assembly selection input

**Value**

HTML elements

---

assignColours	<i>Assign colours to groups</i>
---------------	---------------------------------

---

**Description**

Assign colours to groups

**Usage**

```
assignColours(new, groups = NULL)
```

**Arguments**

new	Matrix: groups to which colours will be assigned
groups	Matrix: groups to check which colours are already assigned

**Value**

Groups with an added column to state the colour

---

basicStats	<i>Basic statistics performed on data</i>
------------	-------------------------------------------

---

**Description**

Variance and median of each group. If data has 2 groups, also calculates the delta variance and delta median.

**Usage**

```
basicStats(data, groups)
```

**Arguments**

data	Numeric, data frame or matrix: data for one gene or alternative splicing event
groups	List of characters (list of groups containing data identifiers) or character vector (group of each value in data)

**Value**

HTML elements

---

blendColours	<i>Blend two HEX colours</i>
--------------	------------------------------

---

**Description**

Blend two HEX colours

**Usage**

```
blendColours(colour1, colour2, colour1Percentage = 0.5)
```

**Arguments**

colour1	Character: HEX colour
colour2	Character: HEX colour
colour1Percentage	Character: percentage of colour 1 mixed in blended colour (default is 0.5)

**Value**

Character representing an HEX colour

**Source**

Code modified from <https://stackoverflow.com/questions/5560248>

**Examples**

```
psychomics:::blendColours("#3f83a3", "#f48000")
```

---

browserHistory	<i>Enable history navigation</i>
----------------	----------------------------------

---

**Description**

Navigate app according to the location given by the navigation bar. Code and logic adapted from <https://github.com/daattali/advanced-shiny/blob/master/navigate-history>

**Usage**

```
browserHistory(navId, input, session)
```

**Arguments**

navId	Character: identifier of the navigation bar
input	Input object
session	Session object

**Value**

NULL (this function is used to modify the Shiny session's state)



bsModal2

*Modified version of shinyBS::bsModal***Description**

bsModal is used within the UI to create a modal window. This allows to modify the modal footer.

**Usage**

```
bsModal2(id, title, trigger, ..., size = NULL, footer = NULL,
         style = NULL)
```

**Arguments**

id	A unique identifier for the modal window
title	The title to appear at the top of the modal
trigger	The id of a button or link that will open the modal.
...	UI elements to include within the modal
size	Character: Modal size (small, default or large)
footer	UI set: List of elements to include in the footer
style	Character: message style can be warning, error, info or NULL

**Value**

HTML elements

calculateInclusionLevels

*Calculate inclusion levels using alternative splicing event annotation and junction quantification for many samples*

**Description**

Calculate inclusion levels using alternative splicing event annotation and junction quantification for many samples

**Usage**

```
calculateInclusionLevels(eventType, junctionQuant, annotation,
                        minReads = 10)
```

**Arguments**

eventType	Character: type of the alternative event to calculate
junctionQuant	Matrix: junction quantification with samples as columns and junctions as rows
annotation	Data.frame: alternative splicing annotation related to event type
minReads	Integer: minimum of total reads required to consider the quantification as valid (10 by default)

**Value**

Matrix with inclusion levels

---

calculateLoadingsContribution

*Calculate the contribution of PCA loadings to the selected principal components*

---

**Description**

Total contribution of a variable is calculated as per:  $((C_x \cdot E_x) + (C_y \cdot E_y)) / (E_x + E_y)$ , where  $C_x$  and  $C_y$  are the contributions of a variable to principal components (x and y) and  $E_x$  and  $E_y$  are the eigenvalues of principal components (x and y)

**Usage**

```
calculateLoadingsContribution(pca, pcX = 1, pcY = 2)
```

**Arguments**

pca	prcomp object
pcX	Character: name of the X axis of interest from the PCA
pcY	Character: name of the Y axis of interest from the PCA

**Value**

Data frame containing the correlation between variables and selected principal components and the contribution of variables to the selected principal components (both individual and total contribution)

**Source**

<http://www.sthda.com/english/articles/31-principal-component-methods-in-r-practical-guide/112-pca-principal-component-analysis-essentials/>

---

checkFileFormat	<i>Checks the format of a file</i>
-----------------	------------------------------------

---

**Description**

Checks the format of a file

**Usage**

```
checkFileFormat(format, head, filename = "")
```

**Arguments**

format	Environment: format of the file
head	Data.frame: head of the file to check
filename	Character: name of the file

**Details**

The name of the file may also be required to be considered of a certain format.

**Value**

TRUE if the file is of the given format; otherwise, returns FALSE

---

checkFirebrowse	<i>Return an user interface depending on the status of the Firebrowse API</i>
-----------------	-------------------------------------------------------------------------------

---

**Description**

If the API is working, it'll be loaded. Else, a message will appear warning the user that the API is down and that will let check again if the API is back online.

**Usage**

```
checkFirebrowse(ns)
```

**Arguments**

ns	Namespace function
----	--------------------

**Value**

HTML elements

---

checkIntegrity	<i>Compute the 32-byte MD5 hashes of one or more files and check with given md5 file</i>
----------------	------------------------------------------------------------------------------------------

---

**Description**

Compute the 32-byte MD5 hashes of one or more files and check with given md5 file

**Usage**

```
checkIntegrity(filesToCheck, md5file)
```

**Arguments**

filesToCheck	Character: files to calculate and match MD5 hashes
md5file	Character: file containing correct MD5 hashes

**Value**

Logical vector showing TRUE for files with matching md5sums and FALSE for files with non-matching md5sums

---

checkSurvivalInput      *Prepare survival terms in case of valid input*

---

**Description**

Prepare survival terms in case of valid input

**Usage**

```
checkSurvivalInput(session, input, coxph = FALSE)
```

**Arguments**

session	Shiny session
input	Shiny input
coxph	Boolean: prepare data for Cox models? FALSE by default

**Value**

NULL (this function is used to modify the Shiny session's state)

---

closeProgress      *Close the progress even if there's an error*

---

**Description**

Close the progress even if there's an error

**Usage**

```
closeProgress(message = NULL, global = if (isRunning()) sharedData else
  getHidden())
```

**Arguments**

message	Character: message to show in progress bar
global	Global Shiny variable where all data is stored

**Value**

NULL (this function is used to modify the Shiny session's state)

---

clusterICAsset	<i>Server logic for clustering ICA data</i>
----------------	---------------------------------------------

---

**Description**

Server logic for clustering ICA data

**Usage**

```
clusterICAsset(session, input, output)
```

**Arguments**

session	Session object
input	Input object
output	Output object

**Value**

NULL (this function is used to modify the Shiny session's state)

---

clusterSet	<i>Server logic for clustering PCA data</i>
------------	---------------------------------------------

---

**Description**

Server logic for clustering PCA data

**Usage**

```
clusterSet(session, input, output)
```

**Arguments**

session	Session object
input	Input object
output	Output object

**Value**

NULL (this function is used to modify the Shiny session's state)

---

colourInputMod	<i>Modified colour input with 100% width</i>
----------------	----------------------------------------------

---

**Description**

Modified colour input with 100% width

**Usage**

```
colourInputMod(...)
```

**Arguments**

... Arguments passed on to `colourpicker::colourInput`

**inputId** The input slot that will be used to access the value.

**label** Display label for the control, or 'NULL' for no label.

**value** Initial value (can be a colour name or HEX code)

**showColour** Whether to show the chosen colour as text inside the input, as the background colour of the input, or both (default).

**palette** The type of colour palette to allow the user to select colours from. `square` (default) shows a square colour palette that allows the user to choose any colour, while `limited` only gives the user a predefined list of colours to choose from.

**allowedCols** A list of colours that the user can choose from. Only applicable when `palette == "limited"`. The `limited` palette uses a default list of 40 colours if `allowedCols` is not defined.

**allowTransparent** If TRUE, enables a slider to choose an alpha (transparency) value for the colour. When a colour with opacity is chosen, the return value is an 8-digit HEX code.

**returnName** If TRUE, then return the name of an R colour instead of a HEX value when possible.

**Value**

HTML elements

---

correlateGEandAS	<i>Correlate gene expression data against alternative splicing quantification</i>
------------------	-----------------------------------------------------------------------------------

---

**Description**

Test for association between paired samples' gene expression (for any genes of interest) and alternative splicing quantification.

**Usage**

```
correlateGEandAS(geneExpr, psi, gene, ASevents = NULL, ...)
```

**Arguments**

geneExpr	Matrix or data frame: gene expression data
psi	Matrix or data frame: alternative splicing quantification data
gene	Character: gene symbol for genes of interest
ASevents	Character: alternative splicing events to correlate with gene expression of a gene (if NULL, the events will be automatically retrieved from the given gene)
...	Arguments passed on to <code>stats:::cor.test.default</code>

**alternative** indicates the alternative hypothesis and must be one of "two.sided", "greater" or "less". You can specify just the initial letter. "greater" corresponds to positive association, "less" to negative association.

**method** a character string indicating which correlation coefficient is to be used for the test. One of "pearson", "kendall", or "spearman", can be abbreviated.

**exact** a logical indicating whether an exact p-value should be computed. Used for Kendall's  $\tau$  and Spearman's  $\rho$ . See 'Details' for the meaning of NULL (the default).

**conf.level** confidence level for the returned confidence interval. Currently only used for the Pearson product moment correlation coefficient if there are at least 4 complete pairs of observations.

**continuity** logical: if true, a continuity correction is used for Kendall's  $\tau$  and Spearman's  $\rho$  when not computed exactly.

**Value**

List of correlations where each element contains:

eventID	Alternative splicing event identifier
cor	Correlation between gene expression and alternative splicing quantification of one alternative splicing event
geneExpr	Gene expression for the selected gene
psi	Alternative splicing quantification for the alternative splicing event

**Examples**

```
annot <- readfile("ex_splicing_annotation.RDS")
junctionQuant <- readfile("ex_junctionQuant.RDS")
psi <- quantifySplicing(annot, junctionQuant, eventType=c("SE", "MXE"))

geneExpr <- readfile("ex_gene_expression.RDS")
correlateGEandAS(geneExpr, psi, "ALDOA")
```

---

createDataTab

*Render a specific data tab (including data table and related interface)*


---

**Description**

Render a specific data tab (including data table and related interface)

**Usage**

```
createDataTab(index, data, name, session, input, output)
```

**Arguments**

index	Integer: index of the data to load
data	Data frame: data with everything to load
name	Character: name of the dataset
session	Shiny session
input	Shiny session input
output	Shiny session output

**Value**

NULL (this function is used to modify the Shiny session's state)

---

```
createDensitySparklines
```

*Create density sparklines for inclusion levels*

---

**Description**

Create density sparklines for inclusion levels

**Usage**

```
createDensitySparklines(data, events, areSplicingEvents = TRUE,  
  groups = NULL, geneExpr = NULL)
```

**Arguments**

data	Character: HTML-formatted data series of interest
events	Character: event identifiers
areSplicingEvents	Boolean: are these splicing events (TRUE) or gene expression (FALSE)?
groups	Character: name of the groups used for differential analyses
geneExpr	Character: name of the gene expression dataset

**Value**

HTML element with sparkline data



---

createEventPlotting     *Create plot for events*

---

### Description

Create plot for events

### Usage

```
createEventPlotting(df, x, y, params, highlightX, highlightY,
  highlightParams, selected, selectedParams, labelled, labelledParams,
  xlim, ylim)
```

### Arguments

df	Data frame
x	Character: name of the variable used for the X axis
y	Character: name of the variable used for the Y axis
params	List of parameters to pass to <a href="#">geom_point</a> related to most points
highlightX	Integer: region of points in X axis to highlight
highlightY	Integer: region of points in Y axis to highlight
highlightParams	List of parameters to pass to <a href="#">geom_point</a> related to highlighted points
selected	Integer: index of rows/points to be coloured
selectedParams	List of parameters to pass to <a href="#">geom_point</a> related to selected points
labelled	Integer: index of rows/points to be labelled
labelledParams	List of parameters to pass to <a href="#">geom_label_repel</a> related to labelled points
xlim	Numeric: limits of X axis
ylim	Numeric: limits of Y axis

### Value

List containing HTML elements and highlighted points

---

createGroup     *Prepare to create group according to specific details*

---

### Description

Prepare to create group according to specific details

### Usage

```
createGroup(session, input, output, id, type)
```

**Arguments**

session	Shiny session
input	Shiny input
output	Shiny output
id	Character: identifier of the group selection
type	Character: type of group to create

**Value**

NULL (this function is used to modify the Shiny session's state)

---

createGroupByColumn     *Split elements into groups based on a given column of a dataset*

---

**Description**

Elements are identified by their respective row name.

**Usage**

```
createGroupByColumn(col, dataset)
createGroupByAttribute(col, dataset)
```

**Arguments**

col	Character: column name
dataset	Matrix or data frame: dataset

**Value**

Named list with each unique value from a given column and respective elements

**Examples**

```
df <- data.frame(gender=c("male", "female"),
                 stage=paste("stage", c(1, 3, 1, 4, 2, 3, 2, 2)))
rownames(df) <- paste0("patient-", LETTERS[1:8])
createGroupByAttribute(col="stage", dataset=df)
```

---

createGroupById	<i>Create groups based on given row indexes or identifiers</i>
-----------------	----------------------------------------------------------------

---

**Description**

Create groups based on given row indexes or identifiers

**Usage**

```
createGroupById(session, rows, identifiers)
```

**Arguments**

session	Shiny session
rows	Character: comma-separated row indexes or identifiers
identifiers	Character: available identifiers

**Value**

Character: values based on given row indexes or identifiers

---

createGroupFromInput	<i>Set new groups according to the user input</i>
----------------------	---------------------------------------------------

---

**Description**

Set new groups according to the user input

**Usage**

```
createGroupFromInput(session, input, output, dataset, id, type)
```

**Arguments**

session	Shiny session
input	Shiny input
output	Shiny output
dataset	Data frame or matrix: dataset of interest
id	Character: identifier of the group selection
type	Character: type of group to create

**Value**

Matrix with the group names and respective elements

---

```
createJunctionsTemplate
```

*Creates a template of alternative splicing junctions*

---

### Description

Creates a template of alternative splicing junctions

### Usage

```
createJunctionsTemplate(nrow, program = character(0),
  event.type = character(0), chromosome = character(0),
  strand = character(0), id = character(0))
```

### Arguments

nrow	Integer: Number of rows
program	Character: Program used to get the junctions
event.type	Character: Event type of the respective events
chromosome	Character: Chromosome of the junctions
strand	Character: positive ("+") or negative ("-") strand of the event
id	Character: events' ID

### Value

A data frame with the junctions coordinate names pre-filled with NAs

### Examples

```
psychomics:::createJunctionsTemplate(nrow = 8)
```

---

```
createOptimalSurvData Create survival data based on a PSI cutoff
```

---

### Description

Data is presented in the table for statistical analyses

### Usage

```
createOptimalSurvData(eventPSI, clinical, censoring, event, timeStart,
  timeStop, match, patients, samples)
```

**Arguments**

eventPSI	Numeric: alternative splicing quantification for multiple samples relative to a single splicing event
clinical	Data frame: clinical data
censoring	Character: censor using "left", "right", "interval" or "interval2"
event	Character: name of column containing time of the event of interest
timeStart	Character: name of column containing starting time of the interval or follow up time
timeStop	Character: name of column containing ending time of the interval (only relevant for interval censoring)
match	Matrix: match between samples and patients
patients	Character: patient identifiers (only required if the clinical argument is not handed)
samples	Character: samples to use when assigning values per patient (if NULL, all samples will be used)

**Value**

Survival data including optimal PSI cutoff, minimal survival p-value and HTML element required to plot survival curves

---

createSparklines	<i>Create sparkline charts to be used in a data table</i>
------------------	-----------------------------------------------------------

---

**Description**

Create sparkline charts to be used in a data table

**Usage**

```
createSparklines(hc, data, events, FUN, groups = NULL, geneExpr = NULL)
```

**Arguments**

hc	Highcharts object
data	Character: HTML-formatted data series of interest
events	Character: event identifiers
FUN	Character: JavaScript function to execute when clicking on a chart
groups	Character: name of the groups used for differential analyses
geneExpr	Character: name of the gene expression dataset

**Value**

HTML element with sparkline data

diffAnalyses

*Perform statistical analyses***Description**

Perform statistical analyses

**Usage**

```
diffAnalyses(data, groups = NULL, analyses = c("wilcoxRankSum",
  "ttest", "kruskal", "levene", "fligner"), pvalueAdjust = "BH",
  geneExpr = NULL, psi = NULL)
```

```
diffAnalysis(data, groups = NULL, analyses = c("wilcoxRankSum",
  "ttest", "kruskal", "levene", "fligner"), pvalueAdjust = "BH",
  geneExpr = NULL, psi = NULL)
```

**Arguments**

data	Data frame or matrix: gene expression or alternative splicing quantification
groups	Named list of characters (containing elements belonging to each group) or character vector (containing the group of each individual sample); if NULL, sample types are used instead when available, e.g. normal, tumour and metastasis
analyses	Character: statistical tests to perform (see Details)
pvalueAdjust	Character: method used to adjust p-values (see Details)
geneExpr	Character: name of the gene expression dataset (only required for density sparklines available in the interactive mode)
psi	Data frame or matrix: alternative splicing quantification (defunct argument, use data instead)

**Details**

The following statistical analyses may be performed by including the respective string in the `analysis` argument:

- `ttest` - Unpaired t-test (2 groups)
- `wilcoxRankSum` - Wilcoxon Rank Sum test (2 groups)
- `kruskal` - Kruskal test (2 or more groups)
- `levene` - Levene's test (2 or more groups)
- `fligner` - Fligner-Killeen test (2 or more groups)
- `density` - Sample distribution per group (only usable through the visual interface)

The following methods for p-value adjustment are supported by using the respective string in the `pvalueAdjust` argument:

- `none`: do not adjust p-values
- `BH`: Benjamini-Hochberg's method (false discovery rate)
- `BY`: Benjamini-Yekutieli's method (false discovery rate)

- bonferroni: Bonferroni correction (family-wise error rate)
- holm: Holm's method (family-wise error rate)
- hochberg: Hochberg's method (family-wise error rate)
- hommel: Hommel's method (family-wise error rate)

**Value**

Table of statistical analyses

**Examples**

```
# Calculate PSI for skipped exon (SE) and mutually exclusive (MXE) events
eventType <- c("SE", "MXE")
annot <- readfile("ex_splicing_annotation.RDS")
junctionQuant <- readfile("ex_junctionQuant.RDS")

psi <- quantifySplicing(annot, junctionQuant, eventType=c("SE", "MXE"))
group <- c(rep("Normal", 3), rep("Tumour", 3))
diffAnalyses(psi, group)
```

---

diffExpressionSet      *Set of functions to perform differential analyses*

---

**Description**

Instructions to build the Shiny app

**Usage**

```
diffExpressionSet(session, input, output)
```

**Arguments**

session	Session object
input	Input object
output	Output object

**Value**

NULL (this function is used to modify the Shiny session's state)

---

diffSplicingSet	<i>Set of functions to perform differential analyses</i>
-----------------	----------------------------------------------------------

---

**Description**

Instructions to build the Shiny app

**Usage**

```
diffSplicingSet(session, input, output)
```

**Arguments**

session	Session object
input	Input object
output	Output object

**Value**

NULL (this function is used to modify the Shiny session's state)

---

disableTab	<i>Enable or disable a tab from the navbar</i>
------------	------------------------------------------------

---

**Description**

Enable or disable a tab from the navbar

**Usage**

```
disableTab(tab)  
enableTab(tab)
```

**Arguments**

tab	Character: tab
-----	----------------

**Value**

NULL (this function is used to modify the Shiny session's state)



---

display	<i>Display characters in the command-line</i>
---------	-----------------------------------------------

---

**Description**

Display characters in the command-line

**Usage**

```
display(char, timeStr = "Time difference of")
```

**Arguments**

char	Character: message
timeStr	Character: message when a difftime object is passed to the char argument

**Value**

NULL (display message in command-line)

---

downloadFiles	<i>Download files to a given directory</i>
---------------	--------------------------------------------

---

**Description**

Download files to a given directory

**Usage**

```
downloadFiles(url, folder, download = download.file, ...)
```

**Arguments**

url	Character: download links
folder	Character: directory to store the downloaded archives
download	Function to use to download files
...	Extra parameters passed to the download function

**Value**

Invisible TRUE if every file was successfully downloaded

**Examples**

```
## Not run:
url <- paste0("https://unsplash.it/400/300/?image=", 570:572)
downloadFiles(url, "~/Pictures")

# Download without printing to console
downloadFiles(url, "~/Pictures", quiet = TRUE)

## End(Not run)
```

---

endProcess	<i>Signal the program that a process has ended</i>
------------	----------------------------------------------------

---

**Description**

Style button to show processing is not occurring. Also, close the progress bar (if TRUE) and print the difference between the current time and a given time (if given time is not NULL)

**Usage**

```
endProcess(id, time = NULL, closeProgressBar = TRUE)
```

**Arguments**

id	Character: button identifier
time	POSIXct object: start time needed to show the interval time (if NULL, the time interval is not displayed)
closeProgressBar	Boolean: close progress bar? TRUE by default

**Value**

NULL (this function is used to modify the Shiny session's state)

---

ensemblToUniprot	<i>Convert an Ensembl identifier to the respective UniProt identifier</i>
------------------	---------------------------------------------------------------------------

---

**Description**

Convert an Ensembl identifier to the respective UniProt identifier

**Usage**

```
ensemblToUniprot(protein)
```

**Arguments**

protein	Character: Ensembl identifier
---------	-------------------------------

**Value**

UniProt protein identifier

**Examples**

```
gene <- "ENSG00000173262"
ensemblToUniprot(gene)

protein <- "ENSP00000445929"
ensemblToUniprot(protein)
```

---

escape	<i>Escape symbols for use in regular expressions</i>
--------	------------------------------------------------------

---

**Description**

Escape symbols for use in regular expressions

**Usage**

```
escape(...)
```

**Arguments**

... Characters to be pasted with no space

**Value**

Escaped string

---

eventPlotOptions	<i>Options for event plotting</i>
------------------	-----------------------------------

---

**Description**

Options for event plotting

**Usage**

```
eventPlotOptions(session, df, xAxis, yAxis, labelSortBy)
```

**Arguments**

session	Shiny session
df	Data frame
xAxis	Character: currently selected variable for the X axis
yAxis	Character: currently selected variable for the Y axis
labelSortBy	Character: currently selected variable for the selectize element to sort differentially analysis

**Value**

HTML elements

---

export\_highcharts      *Add an exporting feature to a highcharts object*

---

### Description

Add an exporting feature to a highcharts object

### Usage

```
export_highcharts(hc, fill = "transparent", text = "Export")
```

### Arguments

hc	A highcharts object
fill	Character: colour fill
text	Character: button text

### Value

A highcharts object with an export button

---

fileBrowser      *Interactive folder selection using a native dialogue*

---

### Description

Interactive folder selection using a native dialogue

### Usage

```
fileBrowser(default = NULL, caption = NULL, multiple = FALSE,
            directory = FALSE)
```

### Arguments

default	Character: path to initial folder
caption	Character: caption on the selection dialogue
multiple	Boolean: allow to select multiple files?
directory	Boolean: allow to select directories instead of files?

### Details

Platform-dependent implementation:

- **Windows:** calls the `utils::choose.files` R function.
- **macOS:** uses AppleScript to display a folder selection dialogue. If default is NA, folder selection fallbacks to the default behaviour of the `choose_folder` AppleScript command. Otherwise, paths are expanded with `path.expand`.
- **Linux:** calls the `zenity` system command.

If for some reason an error occurs (e.g. when using a remote server), the dialog fallbacks to an alternative, non-native file browser.

**Value**

A length one character vector, character NA if 'Cancel' was selected.

**Source**

Original code by wleepang: <https://github.com/wleepang/shiny-directory-input>

---

fileBrowserInput	<i>File browser input</i>
------------------	---------------------------

---

**Description**

Input to interactively select a file or directory on the server

**Usage**

```
fileBrowserInput(id, label, value = NULL, placeholder = NULL,
  info = FALSE, infoFUN = NULL, infoPlacement = "right",
  infoTitle = "", infoContent = "")
```

**Arguments**

id	Character: input identifier
label	Character: input label (NULL to show no label)
value	Character: initial value (paths are expanded via <a href="#">path.expand</a> )
placeholder	Character: placeholder when no file or folder is selected
info	Boolean: add information icon for tooltips and popovers
infoFUN	Function to use to provide information (e.g. <code>shinyBS::bsTooltip</code> and <code>shinyBS::bsPopover</code> )
infoPlacement	Character: placement of the information (top, bottom, right or left)
infoTitle	Character: text to show as title of information
infoContent	Character: text to show as content of information

**Details**

To show the dialog for file input, the [prepareFileBrowser](#) function needs to be included in the server logic.

This widget relies on [fileBrowser](#) to present an interactive dialogue to users for selecting a directory on the local filesystem. Therefore, this widget is intended for shiny apps that are run locally - i.e. on the same system that files/directories are to be accessed - and not from hosted applications (e.g. from <https://www.shinyapps.io>).

**Value**

HTML elements for a file browser input

**Source**

Original code by wleepang: <https://github.com/wleepang/shiny-directory-input>

**See Also**

[updateFileBrowserInput](#) and [prepareFileBrowser](#)

---

filterGroups	<i>Filter groups with less data points than the threshold</i>
--------------	---------------------------------------------------------------

---

**Description**

Groups containing a number of non-missing values less than the threshold are discarded.

**Usage**

```
filterGroups(vector, group, threshold = 1)
```

**Arguments**

vector	Unnamed elements
group	Character: group of the elements
threshold	Integer: number of valid non-missing values by group

**Value**

Named vector with filtered elements from valid groups. The group of the respective element is given in the name.

**Examples**

```
# Removes groups with less than two elements
filterGroups(1:4, c("A", "B", "B", "D"), threshold=2)
```

---

findASeventsFromGene	<i>Find splicing events based on given genes</i>
----------------------	--------------------------------------------------

---

**Description**

Find splicing events based on given genes

**Usage**

```
findASeventsFromGene(psi, gene)
```

**Arguments**

psi	Data frame or matrix: alternative splicing quantification
gene	Character: gene

**Value**

Character vector containing alternative splicing events

---

fisher	<i>Perform Fisher's exact test and return interface to show the results</i>
--------	-----------------------------------------------------------------------------

---

**Description**

Perform Fisher's exact test and return interface to show the results

**Usage**

```
fisher(data, groups)
```

**Arguments**

data	Numeric, data frame or matrix: data for one gene or alternative splicing event
groups	List of characters (list of groups containing data identifiers) or character vector (group of each value in data)

**Value**

HTML elements

---

fligner	<i>Perform Fligner-Killeen test and return interface to show the results</i>
---------	------------------------------------------------------------------------------

---

**Description**

Perform Fligner-Killeen test and return interface to show the results

**Usage**

```
fligner(data, groups, stat = NULL)
```

**Arguments**

data	Numeric, data frame or matrix: data for one gene or alternative splicing event
groups	List of characters (list of groups containing data identifiers) or character vector (group of each value in data)
stat	Data frame or matrix: values of the analyses to be performed (if NULL, the analyses will be performed)

**Value**

HTML elements

---

geneExprFileInput	<i>File input for gene expression</i>
-------------------	---------------------------------------

---

**Description**

File input for gene expression

**Usage**

```
geneExprFileInput(geneExprFileId)
```

**Arguments**

geneExprFileId Character: identifier for gene expression input

**Value**

HTML elements

---

geneExprSurvSet	<i>Logic set to perform survival analysis based on gene expression cut-offs</i>
-----------------	---------------------------------------------------------------------------------

---

**Description**

Logic set to perform survival analysis based on gene expression cut-offs

**Usage**

```
geneExprSurvSet(session, input, output)
```

**Arguments**

session	Session object
input	Input object
output	Output object

**Value**

NULL (this function is used to modify the Shiny session's state)



---

`geNormalisationFilteringInterface`*Interface to normalise and filter gene expression*

---

**Description**

Interface to normalise and filter gene expression

**Usage**

```
geNormalisationFilteringInterface(ns)
```

**Arguments**

ns	Namespace function
----	--------------------

**Value**

HTML elements

---

`getASevent`*Get or set globally accessible elements*

---

**Description**

Get or set globally accessible elements

**Usage**

```
getASevent()
```

**Value**

Getters return globally accessible data, whereas setters return NULL as they are only used to modify the Shiny session's state

**See Also**

[getEvent](#), [getClinicalMatchFrom](#), [getGroups](#) and [getDifferentialSplicing](#)

---

getASevents                      *Get or set globally accessible elements*

---

### Description

Get or set globally accessible elements

### Usage

```
getASevents()
```

### Value

Getters return globally accessible data, whereas setters return NULL as they are only used to modify the Shiny session's state

### See Also

[getEvent](#), [getClinicalMatchFrom](#), [getGroups](#) and [getDifferentialSplicing](#)

---

getAttributesTime                      *Retrieve the time for given columns in a clinical dataset*

---

### Description

Retrieve the time for given columns in a clinical dataset

### Usage

```
getAttributesTime(clinical, event, timeStart, timeStop = NULL,
  followup = "days_to_last_followup")
```

```
getColumnTime(clinical, event, timeStart, timeStop = NULL,
  followup = "days_to_last_followup")
```

### Arguments

clinical	Data frame: clinical data
event	Character: name of column containing time of the event of interest
timeStart	Character: name of column containing starting time of the interval or follow up time
timeStop	Character: name of column containing ending time of the interval (only relevant for interval censoring)
followup	Character: name of column containing follow up time

### Value

Data frame containing the time for the given columns

**Examples**

```
df <- data.frame(followup=c(200, 300, 400), death=c(NA, 300, NA))
rownames(df) <- paste("patient", 1:3)
getAttributesTime(df, event="death", timeStart="death", followup="followup")
```

---

```
getClinicalDataForSurvival
```

*Retrieve clinical data based on attributes required for survival analysis*

---

**Description**

Retrieve clinical data based on attributes required for survival analysis

**Usage**

```
getClinicalDataForSurvival(..., formulaStr = NULL)
```

**Arguments**

...                   Character: names of columns to retrieve  
formulaStr            Character: right-side of the formula for survival analysis

**Value**

Filtered clinical data

---

```
getClinicalMatchFrom    Get or set clinical matches from a given data type
```

---

**Description**

Get or set clinical matches from a given data type

**Usage**

```
getClinicalMatchFrom(dataset, category = getCategory())
setClinicalMatchFrom(dataset, matches, category = getCategory())
```

**Arguments**

dataset               Character: data set name (e.g. "Junction quantification")  
category              Character: data category (e.g. "Carcinoma 2016"); by default, it uses the selected data category  
matches               Vector of integers: clinical matches of dataset

**Value**

Getters return globally accessible data, whereas setters return NULL as they are only used to modify the Shiny session's state

**See Also**

[getEvent](#), [getClinicalMatchFrom](#), [getGroups](#) and [getDifferentialSplicing](#)

---

getData	<i>Get global data</i>
---------	------------------------

---

**Description**

Get global data

**Usage**

```
getData()
```

**Value**

Variable containing all data of interest

---

getDataRows	<i>Get rows of a data frame between two row indexes</i>
-------------	---------------------------------------------------------

---

**Description**

Get rows of a data frame between two row indexes

**Usage**

```
getDataRows(i, data, firstRow, lastRow)
```

**Arguments**

<code>i</code>	Integer: current iteration
<code>data</code>	Data.frame: contains the data of interest
<code>firstRow</code>	Vector of integers: First row index of interest; value must be less than the respective last row index and less than the number of rows in the data frame
<code>lastRow</code>	Vector of integers: Last row index of interest; value must be higher than the respective first row index and less than the number of rows in the data frame

**Details**

For a given iteration `i`, returns data from `firstRow[i]` to `lastRow[i]`

**Value**

Data frame subset from two row indexes (returns NA if the first row index is NA)

---

`getDifferentialExpression`*Get or set differential expression' elements for a data category*

---

**Description**

Get or set differential expression' elements for a data category

**Usage**

```
getDifferentialExpression(category = getCategory())
```

```
setDifferentialExpression(differential, category = getCategory())
```

```
getDifferentialExpressionFiltered(category = getCategory())
```

```
setDifferentialExpressionFiltered(differential, category = getCategory())
```

```
getDifferentialExpressionSurvival(category = getCategory())
```

```
setDifferentialExpressionSurvival(survival, category = getCategory())
```

```
getDifferentialExpressionResetPaging(category = getCategory())
```

```
setDifferentialExpressionResetPaging(reset, category = getCategory())
```

```
getDifferentialExpressionColumns(category = getCategory())
```

```
setDifferentialExpressionColumns(columns, category = getCategory())
```

**Arguments**

<code>category</code>	Character: data category (e.g. "Carcinoma 2016"); by default, it uses the selected data category
<code>differential</code>	Data frame or matrix: differential analyses table
<code>survival</code>	Data frame or matrix: differential analyses' survival data
<code>reset</code>	Character: reset paging of differential analyses table?
<code>columns</code>	Character: differential analyses' column names

**Value**

Getters return globally accessible data, whereas setters return NULL as they are only used to modify the Shiny session's state

**See Also**

[getEvent](#), [getClinicalMatchFrom](#), [getGroups](#) and [getDifferentialSplicing](#)

---

getDifferentialSplicing

*Get or set differential splicing' elements for a data category*

---

### Description

Get or set differential splicing' elements for a data category

### Usage

```
getDifferentialSplicing(category = getCategory())
```

```
setDifferentialSplicing(differential, category = getCategory())
```

```
getDifferentialSplicingFiltered(category = getCategory())
```

```
setDifferentialSplicingFiltered(differential, category = getCategory())
```

```
getDifferentialSplicingSurvival(category = getCategory())
```

```
setDifferentialSplicingSurvival(survival, category = getCategory())
```

```
getDifferentialSplicingResetPaging(category = getCategory())
```

```
setDifferentialSplicingResetPaging(reset, category = getCategory())
```

```
getDifferentialSplicingColumns(category = getCategory())
```

```
setDifferentialSplicingColumns(columns, category = getCategory())
```

### Arguments

category	Character: data category (e.g. "Carcinoma 2016"); by default, it uses the selected data category
differential	Data frame or matrix: differential analyses table
survival	Data frame or matrix: differential analyses' survival data
reset	Character: reset paging of differential analyses table?
columns	Character: differential analyses' column names

### Value

Getters return globally accessible data, whereas setters return NULL as they are only used to modify the Shiny session's state

### See Also

[getEvent](#), [getClinicalMatchFrom](#), [getGroups](#) and [getDifferentialSplicing](#)

---

`getDownloadsFolder`     *Get the Downloads folder of the user*

---

**Description**

Get the Downloads folder of the user

**Usage**

```
getDownloadsFolder()
```

**Value**

Path to Downloads folder

**Examples**

```
getDownloadsFolder()
```

---

`getFirebrowseCohorts`     *Query the Firebrowse web API for available cohorts*

---

**Description**

Query the Firebrowse web API for available cohorts

**Usage**

```
getFirebrowseCohorts(cohort = NULL)
```

```
getFirehoseCohorts(cohort = NULL)
```

```
getTCGAcohorts(cohort = NULL)
```

**Arguments**

`cohort`             Character: filter by given cohorts (optional)

**Value**

Character with cohort abbreviations (as values) and description (as names)

**Examples**

```
if (isFirebrowseUp()) getFirebrowseCohorts()
```

```
getFirebrowseDataTypes
```

*Get data types available from Firebrowse*

---

**Description**

Get data types available from Firebrowse

**Usage**

```
getFirebrowseDataTypes()
```

```
getFirehoseDataTypes()
```

**Value**

Named character vector

**Examples**

```
getFirebrowseDataTypes()
```

---

```
getFirebrowseDateFormat
```

*Returns the date format used by the Firebrowse web API*

---

**Description**

Returns the date format used by the Firebrowse web API

**Usage**

```
getFirebrowseDateFormat()
```

**Value**

Named list with Firebrowse web API's date formats

**Examples**

```
format <- psychomics:::getFirebrowseDateFormat()
```

```
# date format to use in a query to Firebrowse web API  
format$query
```

```
# date format to parse a date in a response from Firebrowse web API  
format$response
```



---

getFirebrowseDates      *Query the Firebrowse web API for the available data timestamps*

---

**Description**

Query the Firebrowse web API for the available data timestamps

**Usage**

```
getFirebrowseDates()
```

```
getFirehoseDates()
```

```
getTCGAdates()
```

**Value**

Parsed date with timestamps of the data available

**Examples**

```
if (isFirebrowseUp()) getFirebrowseDates()
```

---

getGenes      *Get or set globally accessible elements*

---

**Description**

Get or set globally accessible elements

**Usage**

```
getGenes()
```

**Value**

Getters return globally accessible data, whereas setters return NULL as they are only used to modify the Shiny session's state

**See Also**

[getEvent](#), [getClinicalMatchFrom](#), [getGroups](#) and [getDifferentialSplicing](#)

---

```
getGenesFromSplicingEvents
```

*Retrieve genes based on given alternative splicing events*

---

### Description

Retrieve genes based on given alternative splicing events

### Usage

```
getGenesFromSplicingEvents(ASevents)
```

### Arguments

ASevents          Character: alternative splicing events

### Value

Named character containing alternative splicing events and their respective genes as names

---

```
getGlobal
```

*Get or set globally accessible elements*

---

### Description

Get or set globally accessible elements

### Usage

```
getGlobal(category = getCategory(), ..., sep = "_")
```

```
setGlobal(category = getCategory(), ..., value, sep = "_")
```

```
setData(data)
```

```
setDataTable(name, value, category = getCategory())
```

```
getAutoNavigation()
```

```
setAutoNavigation(auto)
```

```
getCores()
```

```
setCores(integer)
```

```
getSignificant()
```

```
setSignificant(integer)
```

```
getPrecision()
```

```
setPrecision(integer)
```

**Arguments**

category	Character: data category (e.g. "Carcinoma 2016"); by default, it uses the selected data category
...	Arguments to identify a variable
sep	Character to separate identifiers
value	Value to attribute to an element
data	List of data frame or matrix to set as data
name	Character: data table name
auto	Boolean: enable automatic navigation of browser history?
integer	Integer: value of the setting

**Value**

Getters return globally accessible data, whereas setters return NULL as they are only used to modify the Shiny session's state

**Note**

Needs to be called inside a reactive function

**See Also**

[getEvent](#), [getClinicalMatchFrom](#), [getGroups](#) and [getDifferentialSplicing](#)

---

getGroups	<i>Get or set groups</i>
-----------	--------------------------

---

**Description**

Get or set groups

**Usage**

```
getGroups(type = c("Patients", "Samples", "ASevents", "Genes"),
  complete = FALSE, category = getCategory())
```

```
setGroups(type = c("Patients", "Samples", "ASevents", "Genes"), groups,
  category = getCategory())
```

**Arguments**

type	Character: type of groups (either "Patients", "Samples", "ASevents" or "Genes")
complete	Boolean: return all the information on groups (TRUE) or just the group names and respective indexes (FALSE)? FALSE by default
category	Character: data category (e.g. "Carcinoma 2016"); by default, it uses the selected data category
groups	Matrix: groups of dataset

**Value**

Getters return globally accessible data, whereas setters return NULL as they are only used to modify the Shiny session's state

**See Also**

[getEvent](#), [getClinicalMatchFrom](#), [getGroups](#) and [getDifferentialSplicing](#)

---

getGtexTissues	<i>Get GTEx tissues from given GTEx sample attributes</i>
----------------	-----------------------------------------------------------

---

**Description**

Get GTEx tissues from given GTEx sample attributes

**Usage**

```
getGtexTissues(sampleMetadata)
```

```
getGTExTissues(sampleMetadata)
```

**Arguments**

sampleMetadata Character: path to sample attributes

**Value**

Character: available tissues

---

getHidden	<i>Get or set hidden globally accessible elements</i>
-----------	-------------------------------------------------------

---

**Description**

Get or set hidden globally accessible elements

**Usage**

```
getHidden()
```

```
setHidden(val)
```

**Arguments**

val Value to attribute

**Value**

Getters return hidden globally accessible data, whereas setters return NULL as they are only used to modify the state of hidden elements

---

getHighlightedPoints *Get or set points or regions for plots*

---

### Description

Get or set points or regions for plots

### Usage

```
getHighlightedPoints(id, category = getCategory())  
setHighlightedPoints(id, events, category = getCategory())  
getZoom(id, category = getCategory())  
setZoom(id, zoom, category = getCategory())  
getSelectedPoints(id, category = getCategory())  
setSelectedPoints(id, events, category = getCategory())  
getLabelledPoints(id, category = getCategory())  
setLabelledPoints(id, events, category = getCategory())
```

### Arguments

id	Character: identifier
category	Character: data category (e.g. "Carcinoma 2016"); by default, it uses the selected data category
events	Integer: index of events
zoom	Integer: range of X and Y coordinates for zooming

### Value

Getters return globally accessible data, whereas setters return NULL as they are only used to modify the Shiny session's state

### See Also

[getEvent](#), [getClinicalMatchFrom](#), [getGroups](#) and [getDifferentialSplicing](#)

---

getMatchingSamples      *Get samples matching the given patients*

---

### Description

Get samples matching the given patients

### Usage

```
getMatchingSamples(patients, samples, clinical = NULL, rm.NA = TRUE,
  match = NULL, showMatch = FALSE)

getSampleFromPatient(patients, samples, clinical = NULL, rm.NA = TRUE,
  match = NULL, showMatch = FALSE)

getSampleFromSubject(patients, samples, clinical = NULL, rm.NA = TRUE,
  match = NULL, showMatch = FALSE)
```

### Arguments

patients	Character or list of characters: patient identifiers
samples	Character: sample identifiers
clinical	Data frame or matrix: clinical dataset
rm.NA	Boolean: remove NAs? TRUE by default
match	Integer: vector of patient index with the sample identifiers as name to save time (optional)
showMatch	Boolean: show matching patient index? FALSE by default

### Value

Names of the matching samples (if showMatch is TRUE, a character with the patients as values and their respective samples as names is returned)

### Examples

```
patients <- c("GTEX-ABC", "GTEX-DEF", "GTEX-GHI", "GTEX-JKL", "GTEX-MNO")
samples <- paste0(patients, "-sample")
clinical <- data.frame(samples=samples)
rownames(clinical) <- patients
getMatchingSamples(patients[c(1, 4)], samples, clinical)
```

---

getNumerics	<i>Convert a column to numeric if possible and ignore given columns composed of lists</i>
-------------	-------------------------------------------------------------------------------------------

---

**Description**

Convert a column to numeric if possible and ignore given columns composed of lists

**Usage**

```
getNumerics(table, by = NULL, toNumeric = FALSE)
```

**Arguments**

table	Data matrix: table
by	Character: column names of interest
toNumeric	Boolean: which columns to convert to numeric (FALSE by default)

**Value**

Processed data matrix

**Examples**

```
event <- read.table(text = "ABC123 + 250 300 350
                          DEF456 - 900 800 700")
names(event) <- c("Event ID", "Strand", "C1.end", "A1.end", "A1.start")

# Let's change one column to character
event[ , "C1.end"] <- as.character(event[ , "C1.end"])
is.character(event[ , "C1.end"])

event <- psychomics::getNumerics(event, by = c("Strand", "C1.end", "A1.end",
                                              "A1.start"),
                                 toNumeric = c(FALSE, TRUE, TRUE, TRUE))

# Let's check if the same column is now integer
is.numeric(event[ , "C1.end"])
```

---

getPatientFromSample	<i>Get patients from given samples</i>
----------------------	----------------------------------------

---

**Description**

Get patients from given samples

**Usage**

```
getPatientFromSample(sampleId, patientId = NULL, na = FALSE,
                     sampleInfo = NULL)

getSubjectFromSample(sampleId, patientId = NULL, na = FALSE,
                     sampleInfo = NULL)
```

**Arguments**

sampleId	Character: sample identifiers
patientId	Character: patient identifiers to filter by (optional; if a matrix or data frame is given, its rownames will be used to infer the patient identifiers)
na	Boolean: return NA for samples with no matching patients
sampleInfo	Data frame or matrix: sample information containing the sample identifiers as rownames and a column named "Subject ID" with the respective subject identifiers

**Value**

Character: patient identifiers corresponding to the given samples

**Examples**

```
samples <- paste0("GTEX-", c("ABC", "DEF", "GHI", "JKL", "MNO"), "-sample")
getPatientFromSample(samples)

# Filter returned samples based on available patients
patients <- paste0("GTEX-", c("DEF", "MNO"))
getPatientFromSample(samples, patients)
```

---

getServerFunctions      *Matches server functions from a given loader*

---

**Description**

Matches server functions from a given loader

**Usage**

```
getServerFunctions(loader, ..., priority = NULL)
```

**Arguments**

loader	Character: loader to run the functions
...	Extra arguments to pass to server functions
priority	Character: name of functions to prioritise by the given order; for instance, c("data", "analyses") would load "data", then "analyses" then remaining functions

**Value**

Invisible TRUE



---

```
getSplicingEventCoordinates
```

*Returns the coordinates of interest for a given event type*

---

### Description

Returns the coordinates of interest for a given event type

### Usage

```
getSplicingEventCoordinates(type, sorting = FALSE)
```

### Arguments

type	Character: alternative splicing event type
sorting	Boolean: get coordinates used for sorting and comparison between different programs? FALSE by default

### Value

Coordinates of interest according to the alternative splicing event type

---

```
getSplicingEventFromGenes
```

*Retrieve alternative splicing events based on given genes*

---

### Description

Retrieve alternative splicing events based on given genes

### Usage

```
getSplicingEventFromGenes(genes, ASevents)
```

### Arguments

genes	Character: gene symbols (or TCGA-styled gene symbols)
ASevents	Character: alternative splicing events to be matched

### Value

Character containing respective alternative splicing events

### Examples

```
ASevents <- c("SE_1+_201763003_201763300_201763374_201763594_NAV1",
             "SE_1+_183515472_183516238_183516387_183518343_SMG7",
             "SE_1+_183441784_183471388_183471526_183481972_SMG7",
             "SE_1+_181019422_181022709_181022813_181024361_MR1",
             "SE_1+_181695298_181700311_181700367_181701520_CACNA1E")
genes <- c("NAV1", "SMG7", "MR1", "HELLO")
getSplicingEventFromGenes(genes, ASevents)
```

---

getSplicingEventTypes *Splicing event types available*

---

**Description**

Splicing event types available

**Usage**

```
getSplicingEventTypes(acronymsAsNames = FALSE)
```

**Arguments**

acronymsAsNames  
 Boolean: return acronyms as names? FALSE by default

**Value**

Named character vector with splicing event types

**Examples**

```
getSplicingEventTypes()
```

---

getUiFunctions *Matches user interface (UI) functions from a given loader*

---

**Description**

Matches user interface (UI) functions from a given loader

**Usage**

```
getUiFunctions(ns, loader, ..., priority = NULL)
```

**Arguments**

ns                    Shiny function to create IDs within a namespace  
 loader                Character: loader to run the functions  
 ...                    Extra arguments to pass to the user interface (UI) functions  
 priority              Character: name of functions to prioritise by the given order; for instance, c("data", "analyses") would load "data", then "analyses" then remaining functions

**Value**

List of functions related to the given loader

---

getValidEvents	<i>Filters the events with valid elements according to the given validator</i>
----------------	--------------------------------------------------------------------------------

---

## Description

Filters the events with valid elements according to the given validator

## Usage

```
getValidEvents(event, validator, areMultipleExonsValid = FALSE)
```

## Arguments

event	Data.frame containing only one event with at least 7 columns as retrieved from the alternative splicing annotation files from MISO (GFF3 files)
validator	Character: valid elements for each event
areMultipleExonsValid	Boolean: consider runs of exons as valid when comparing with the validator? Default is FALSE (see details)

## Details

areMultipleExonsValid allows to consider runs of exons (i.e. sequences where "exon" occurs consecutively) as valid when comparing with given validator. For example, if the validator is c("gene", "mRNA", "exon") and areMultipleExonsValid = FALSE, this function will only considerate events as valid if they have the exact same elements. If areMultipleExonsValid = TRUE, a valid events could include the elements c("gene", "mRNA", "exon", "exon", "exon").

## Value

Data.frame with valid events

## Examples

```
event <- read.table(text = "
chr1 SE gene 17233 18061 . - .
chr1 SE dkfd 00000 30000 . - .
chr1 SE mRNA 17233 18061 . - .
chr1 SE exon 17233 17368 . - .
chr1 SE exon 17526 17742 . - .
chr1 SE exon 17915 18061 . - .
chr1 SE mRNA 17233 18061 . - .
chr1 SE exon 17233 17368 . - .
chr1 SE exon 17915 18061 . - .
chr1 SE gene 17233 18061 . - .
chr1 SE mRNA 17233 18061 . - .
chr1 SE exon 17233 17368 . - .
chr1 SE exon 17606 17742 . - .
chr1 SE exon 17915 18061 . - .
chr1 SE mRNA 17233 18061 . - .
chr1 SE exon 17233 17368 . - .
chr1 SE exon 17915 18061 . - .
")
```

```
validator <- c("gene", "mRNA", rep("exon", 3), "mRNA", rep("exon", 2))
psychomics::getValidEvents(event, validator)
```

---

getValuePerPatient      *Assign average sample values to their corresponding patients*

---

## Description

Assign average sample values to their corresponding patients

## Usage

```
getValuePerPatient(data, match, clinical = NULL, patients = NULL,
  samples = NULL)
```

```
getValuePerSubject(data, match, clinical = NULL, patients = NULL,
  samples = NULL)
```

```
assignValuePerPatient(data, match, clinical = NULL, patients = NULL,
  samples = NULL)
```

```
assignValuePerSubject(data, match, clinical = NULL, patients = NULL,
  samples = NULL)
```

```
getPSIperPatient(psi, match, clinical = NULL, patients = NULL, ...)
```

## Arguments

data	One-row data frame/matrix or vector: values per sample for a single gene
match	Matrix: match between samples and patients
clinical	Data frame or matrix: clinical dataset (only required if the patients argument is not handed)
patients	Character: patient identifiers (only required if the clinical argument is not handed)
samples	Character: samples to use when assigning values per patient (if NULL, all samples will be used)
psi	Data frame or matrix: values per sample
...	Deprecated arguments

## Value

Values per patient

---

ggplotServer	<i>Logic set to create an interactive ggplot</i>
--------------	--------------------------------------------------

---

**Description**

Logic set to create an interactive ggplot

**Usage**

```
ggplotServer(input, output, id, plot = NULL, df = NULL, x = NULL,
             y = NULL)
```

```
ggplotAuxServer(input, output, id)
```

**Arguments**

input	Shiny input
output	Shiny output
id	Character: identifier
plot	Character: plot expression (NULL renders no plot)
df	Data frame
x	Character: name of the variable used for the X axis
y	Character: name of the variable used for the Y axis

**Value**

NULL (this function is used to modify the Shiny session's state)

**Note**

Insert ggplotAuxSet outside any observer (so it is only run once)

---

ggplotTooltip	<i>Create the interface for the tooltip of a plot</i>
---------------	-------------------------------------------------------

---

**Description**

Create the interface for the tooltip of a plot

**Usage**

```
ggplotTooltip(df, hover, x, y)
```

**Arguments**

df	Data frame
hover	Mouse hover information for a given plot as retrieved from <a href="#">hoverOpts</a>
x	Character: name of the variable used for the X axis
y	Character: name of the variable used for the Y axis

**Value**

HTML elements

---

ggplotUI	<i>Interface for interactive ggplot</i>
----------	-----------------------------------------

---

**Description**

Interface for interactive ggplot

**Usage**

```
ggplotUI(id)
```

**Arguments**

id	Character: identifier
----	-----------------------

**Value**

HTML elements

---

globalSelectize	<i>Create a selectize input available from any page</i>
-----------------	---------------------------------------------------------

---

**Description**

Create a selectize input available from any page

**Usage**

```
globalSelectize(id, placeholder)
```

**Arguments**

id	Character: input identifier
placeholder	Character: input placeholder

**Value**

HTML element for a global selectize input

---

groupByAttribute	<i>User interface to group by attribute</i>
------------------	---------------------------------------------

---

**Description**

User interface to group by attribute

**Usage**

```
groupByAttribute(ns, cols, id, example)
```

**Arguments**

ns	Namespace function
cols	Character or list: name of columns to show
id	Character: identifier
example	Character: text to show as an example

**Value**

HTML elements

---

groupByExpression	<i>User interface to group by subset expression</i>
-------------------	-----------------------------------------------------

---

**Description**

User interface to group by subset expression

**Usage**

```
groupByExpression(ns, id)
```

**Arguments**

ns	Namespace function
id	Character: identifier

**Value**

HTML elements

---

groupByGrep	<i>User interface to group by grep expression</i>
-------------	---------------------------------------------------

---

**Description**

User interface to group by grep expression

**Usage**

```
groupByGrep(ns, cols, id)
```

**Arguments**

ns	Namespace function
cols	Character or list: name of columns to show
id	Character: identifier

**Value**

HTML elements

---

groupById	<i>User interface to group by row</i>
-----------	---------------------------------------

---

**Description**

User interface to group by row

**Usage**

```
groupById(ns, id)
```

**Arguments**

ns	Namespace function
id	Character: identifier

**Value**

HTML elements



---

groupManipulation      *Logic server to manipulate data grouping*

---

**Description**

Logic server to manipulate data grouping

**Usage**

```
groupManipulation(input, output, session, type)
```

**Arguments**

input	Input object
output	Output object
session	Session object
type	Character: type of data for each the interface is intended

**Value**

HTML elements

---

groupManipulationInput  
*Interface to manipulate data grouping*

---

**Description**

Interface to manipulate data grouping

**Usage**

```
groupManipulationInput(id, type)
```

**Arguments**

id	Character: identifier
type	Character: type of data for each the interface is intended

**Value**

HTML elements

---

groupPerElem	<i>Assign one group to each element</i>
--------------	-----------------------------------------

---

**Description**

Assign one group to each element

**Usage**

```
groupPerElem(groups, elem = NULL, outerGroupName = NA)
```

```
groupPerPatient(groups, patients = NULL, includeOuterGroup = FALSE,
  outerGroupName = "(Outer data)")
```

```
groupPerSample(groups, samples, includeOuterGroup = FALSE,
  outerGroupName = "(Outer data)")
```

**Arguments**

groups	List of integers: groups of elements
elem	Character: all elements available (NULL by default)
outerGroupName	Character: name to give to outer group (NA by default; set to NULL to only show elements matched to their respective groups)
patients	Integer: total number of patients
includeOuterGroup	Boolean: join the patients that have no groups?
samples	Character: all available samples

**Value**

Character vector where each element corresponds to the group of the respective element

**Examples**

```
groups <- list(1:3, 4:7, 8:10)
names(groups) <- paste("Stage", 1:3)
groupPerElem(groups)
```

---

groupsServerOnce	<i>Server function for data grouping (one call)</i>
------------------	-----------------------------------------------------

---

**Description**

These functions only run once instead of running for every instance of groups

**Usage**

```
groupsServerOnce(input, output, session)
```

**Arguments**

input	Input object
output	Output object
session	Session object

**Value**

NULL (this function is used to modify the Shiny session's state)

---

hchart.survfit	<i>Plot survival curves using Highcharts</i>
----------------	----------------------------------------------

---

**Description**

Plot survival curves using Highcharts

**Usage**

```
## S3 method for class 'survfit'
hchart(object, ..., fun = NULL, markTimes = TRUE,
        symbol = "plus", markerColor = "black", ranges = FALSE,
        rangesOpacity = 0.3)
```

**Arguments**

object	A survfit object as returned from the survfit function
...	Arguments passed on to highcharter::hc_add_series
fun	Name of function or function used to transform the survival curve: log will put y axis on log scale, event plots cumulative events ( $f(y) = 1-y$ ), cumhaz plots the cumulative hazard function ( $f(y) = -\log(y)$ ), and cloglog creates a complimentary log-log survival plot ( $f(y) = \log(-\log(y))$ ) along with log scale for the x-axis.
markTimes	Label curves marked at each censoring time? TRUE by default
symbol	Symbol to use as marker (plus sign by default)
markerColor	Colour of the marker ("black" by default); use NULL to use the respective colour of each series
ranges	Plot interval ranges? FALSE by default
rangesOpacity	Opacity of the interval ranges (0.3 by default)

**Value**

highcharter object to plot survival curves

**Examples**

```

# Plot Kaplan-Meier curves
require("survival")
require("highcharter")
leukemia.surv <- survfit(Surv(time, status) ~ x, data = aml)
hchart(leukemia.surv)

# Plot the cumulative hazard function
lsurv2 <- survfit(Surv(time, status) ~ x, aml, type='fleming')
hchart(lsurv2, fun="cumhaz")

# Plot the fit of a Cox proportional hazards regression model
fit <- coxph(Surv(futime, fustat) ~ age, data = ovarian)
ovarian.surv <- survfit(fit, newdata=data.frame(age=60))
hchart(ovarian.surv, ranges = TRUE)

```

---

`hc_scatter`*Create scatter plot*

---

**Description**

Create a scatter plot using highcharter

**Usage**

```
hc_scatter(hc, x, y, z = NULL, label = NULL, showInLegend = FALSE,
  ...)
```

**Arguments**

<code>hc</code>	Highchart object
<code>x</code>	Numeric: X axis
<code>y</code>	Numeric: Y axis
<code>z</code>	Numeric: Z axis to set the bubble size (optional)
<code>label</code>	Character: data label for each point (optional)
<code>showInLegend</code>	Boolean: show the data in the legend box? FALSE by default
<code>...</code>	Arguments passed on to highcharter::hc_add_series

**Value**

highcharter object containing information for a scatter plot

---

inclusionLevelsInterface

*Interface to quantify alternative splicing*


---

**Description**

Interface to quantify alternative splicing

**Usage**

```
inclusionLevelsInterface(ns)
```

**Arguments**

ns	Namespace function
----	--------------------

**Value**

HTML elements

---

inlineDialog

*Alert in the style of a dialogue box with a button*


---

**Description**

Alert in the style of a dialogue box with a button

**Usage**

```
inlineDialog(description, ..., buttonLabel = NULL, buttonIcon = NULL,
  buttonId = NULL, id = NULL, type = c("error", "warning"),
  bigger = FALSE)
```

```
errorDialog(description, ...)
```

```
warningDialog(description, ...)
```

**Arguments**

description	Character: description
...	Extra parameters when creating the alert
buttonLabel	Character: button label (NULL by default)
buttonIcon	Character: button icon (NULL by default)
buttonId	Character: button identifier (NULL by default)
id	Character: identifier (NULL by default)
type	Character: type of alert (error or warning)
bigger	Boolean: wrap the description in a h4 tag?

**Value**

HTML elements

---

insideFile	<i>Get psychomics file inside a given directory</i>
------------	-----------------------------------------------------

---

**Description**

Get psychomics file inside a given directory

**Usage**

```
insideFile(...)
```

**Arguments**

... character vectors, specifying subdirectory and file(s) within some package. The default, none, returns the root of the package. Wildcards are not supported.

**Value**

Loaded file

---

is.whole	<i>Check if a number is whole</i>
----------	-----------------------------------

---

**Description**

Check if a number is whole

**Usage**

```
is.whole(x, tol = .Machine$double.eps^0.5)
```

**Arguments**

x	Object to be tested
tol	Numeric: tolerance used for comparison

**Value**

TRUE if number is whole; otherwise, FALSE

---

isFile	<i>Check if files exist</i>
--------	-----------------------------

---

**Description**

Check if files exist

**Usage**

```
isFile(files)
```

**Arguments**

files                   Character: vector of filepaths to check

**Value**

Boolean vector stating whether each file exists or not

---

isFirebrowseUp	<i>Check whether the Firebrowse web API is running</i>
----------------	--------------------------------------------------------

---

**Description**

The Firebrowse web API is running if it returns the status condition 200; if this is not the status code obtained from the API, the function will raise a warning with the status code and a brief explanation.

**Usage**

```
isFirebrowseUp()
```

```
isFirehoseUp()
```

**Value**

Invisible TRUE if the Firebrowse web API is working; otherwise, raises a warning

**Examples**

```
isFirebrowseUp()
```

---

isRStudioServer	<i>Check if running in RStudio Server</i>
-----------------	-------------------------------------------

---

**Description**

Check if running in RStudio Server

**Usage**

```
isRStudioServer()
```

**Value**

Boolean stating whether running in RStudio Server

---

joinEventsPerType	<i>Full outer join all given events based on select columns</i>
-------------------	-----------------------------------------------------------------

---

**Description**

Full outer join all given events based on select columns

**Usage**

```
joinEventsPerType(events, types)
```

**Arguments**

events	Data frame or matrix: alternative splicing events
types	Character: alternative splicing types

**Value**

List of events joined by alternative splicing event type



---

junctionString	<i>String used to search for matches in a junction quantification file</i>
----------------	----------------------------------------------------------------------------

---

**Description**

String used to search for matches in a junction quantification file

**Usage**

```
junctionString(chr, strand, junc5, junc3, showStrand)
```

**Arguments**

chr	Character: chromosome
strand	Character: strand
junc5	Integer: 5' end junction
junc3	Integer: 3' end junction
showStrand	Boolean: include strand?

**Value**

Formatted character string

---

kruskal	<i>Perform Kruskal's test and return interface to show the results</i>
---------	------------------------------------------------------------------------

---

**Description**

Perform Kruskal's test and return interface to show the results

**Usage**

```
kruskal(data, groups, stat = NULL)
```

**Arguments**

data	Numeric, data frame or matrix: data for one gene or alternative splicing event
groups	List of characters (list of groups containing data identifiers) or character vector (group of each value in data)
stat	Data frame or matrix: values of the analyses to be performed (if NULL, the analyses will be performed)

**Value**

HTML elements

---

labelBasedOnCutoff      *Label groups based on a given cutoff*

---

### Description

Label groups based on a given cutoff

### Usage

```
labelBasedOnCutoff(data, cutoff, label = NULL, gte = TRUE)
```

### Arguments

data	Numeric: test data
cutoff	Numeric: test cutoff
label	Character: label to prefix group names (NULL by default)
gte	Boolean: test with greater than or equal to cutoff (TRUE) or use less than or equal to cutoff (FALSE)? TRUE by default

### Value

Labelled groups

### Examples

```
labelBasedOnCutoff(data=c(1, 0, 0, 1, 0, 1), cutoff=0.5)

labelBasedOnCutoff(data=c(1, 0, 0, 1, 0, 1), cutoff=0.5, "Ratio")

# Use "greater than" instead of "greater than or equal to"
labelBasedOnCutoff(data=c(1, 0, 0, 0.5, 0, 1), cutoff=0.5, gte=FALSE)
```

---

levene      *Perform Levene's test and return interface to show the results*

---

### Description

Perform Levene's test and return interface to show the results

### Usage

```
levene(data, groups, stat = NULL)
```

### Arguments

data	Numeric, data frame or matrix: data for one gene or alternative splicing event
groups	List of characters (list of groups containing data identifiers) or character vector (group of each value in data)
stat	Data frame or matrix: values of the analyses to be performed (if NULL, the analyses will be performed)

**Value**

HTML elements

---

leveneTest	<i>Levene's test</i>
------------	----------------------

---

**Description**

Performs a Levene's test to assess the equality of variances

**Usage**

```
leveneTest(x, g, centers = median)
```

**Arguments**

x	a numeric vector of data values, or a list of numeric data vectors. Non-numeric elements of a list will be coerced, with a warning.
g	a vector or factor object giving the group for the corresponding elements of x. Ignored with a warning if x is a list.
centers	Function used to calculate how much values spread (median by default; another common function used is mean)

**Details**

The implementation of this function is based on `car:::leveneTest.default` with a more standard result.

**Value**

A list with class "htest" containing the following components:

statistic	the value of the test statistic with a name describing it.
p.value	the p-value for the test.
method	the type of test applied.
data.name	a character string giving the names of the data.

**Examples**

```
vals <- sample(30, replace=TRUE)
group <- lapply(list("A", "B", "C"), rep, 10)
group <- unlist(group)
psychomics:::leveneTest(vals, group)

## Using Levene's test based on the mean
psychomics:::leveneTest(vals, group, mean)
```

---

linkToArticle	<i>Interface that directs users to original article</i>
---------------	---------------------------------------------------------

---

**Description**

Interface that directs users to original article

**Usage**

```
linkToArticle()
```

**Value**

HTML elements

---

linkToRunJS	<i>Link to run arbitrary JavaScript code</i>
-------------	----------------------------------------------

---

**Description**

Link to run arbitrary JavaScript code

**Usage**

```
linkToRunJS(text, code)
```

**Arguments**

text	Character: text label
code	Character: JavaScript code

**Value**

HTML elements

---

listAllAnnotations	<i>List alternative splicing annotation files available, as well as custom annotation</i>
--------------------	-------------------------------------------------------------------------------------------

---

**Description**

List alternative splicing annotation files available, as well as custom annotation

**Usage**

```
listAllAnnotations(...)
```

**Arguments**

... Custom annotation loaded

**Value**

Named character vector with splicing annotation files available#'

**Examples**

```
psychomics::listAllAnnotations()
```

---

listSplicingAnnotations	<i>List the alternative splicing annotation files available</i>
-------------------------	-----------------------------------------------------------------

---

**Description**

List the alternative splicing annotation files available

**Usage**

```
listSplicingAnnotations()
```

**Value**

Named character vector with splicing annotation files available

**Examples**

```
listSplicingAnnotations()
```

---

loadAnnotation	<i>Load alternative splicing annotation from AnnotationHub</i>
----------------	----------------------------------------------------------------

---

**Description**

Load alternative splicing annotation from AnnotationHub

**Usage**

```
loadAnnotation(annotation)
```

**Arguments**

annotation      Character: annotation to load

**Value**

List of data frames containing the alternative splicing annotation per event type

**Examples**

```
human <- listSplicingAnnotations()[[1]]
## Not run:
annot <- loadAnnotation(human)

## End(Not run)
```

---

loadBy	<i>Check if a given function should be loaded by the calling module</i>
--------	-------------------------------------------------------------------------

---

**Description**

Check if a given function should be loaded by the calling module

**Usage**

```
loadBy(loader, FUN)
```

**Arguments**

loader            Character: name of the file responsible to load such function  
FUN                Function

**Value**

Boolean vector

---

 loadCustomSplicingAnnotationSet

*Set of functions to load a custom alternative splicing annotation*


---

**Description**

Instructions to build the Shiny app

**Usage**

```
loadCustomSplicingAnnotationSet(session, input, output)
```

**Arguments**

session	Session object
input	Input object
output	Output object

**Value**

NULL (this function is used to modify the Shiny session's state)

---

 loadedDataModal

*Create a modal warning the user of already loaded data*


---

**Description**

Create a modal warning the user of already loaded data

**Usage**

```
loadedDataModal(session, modalId, replaceButtonId, keepButtonId)
```

**Arguments**

session	Shiny session
modalId	Character: identifier of the modal
replaceButtonId	Character: identifier of the button to replace data
keepButtonId	Character: identifier of the button to append data

**Value**

HTML elements for a warning modal reminding data is loaded

---

loadFile	<i>Loads a file according to its format</i>
----------	---------------------------------------------

---

**Description**

Loads a file according to its format

**Usage**

```
loadFile(format, file, ...)
```

**Arguments**

format	Environment: format of the file
file	Character: file to load
...	Extra parameters passed to <a href="#">fread</a>

**Details**

The resulting data frame includes the attribute `tablename` with the name of the data frame

**Value**

Data frame with the loaded file

---

loadFileFormats	<i>Loads file formats</i>
-----------------	---------------------------

---

**Description**

Loads file formats

**Usage**

```
loadFileFormats()
```

**Value**

Loaded file formats available



---

loadFirebrowseData	<i>Downloads and processes data from the Firebrowse web API and loads it into R</i>
--------------------	-------------------------------------------------------------------------------------

---

### Description

Downloads and processes data from the Firebrowse web API and loads it into R

### Usage

```
loadFirebrowseData(folder = NULL, data = NULL, exclude = c(".aux.",
  ".mage-tab.", "MANIFEST.txt"), ..., download = TRUE)
```

```
loadFirehoseData(folder = NULL, data = NULL, exclude = c(".aux.",
  ".mage-tab.", "MANIFEST.txt"), ..., download = TRUE)
```

```
loadTCGAdata(folder = NULL, data = NULL, exclude = c(".aux.",
  ".mage-tab.", "MANIFEST.txt"), ..., download = TRUE)
```

### Arguments

folder	Character: directory to store the downloaded archives (by default, it saves in the user's "Downloads" folder)
data	Character: data to load
exclude	Character: files and folders to exclude from downloading and from loading into R (by default, it excludes .aux., .mage-tab. and MANIFEST.TXT files)
...	Arguments passed on to queryFirebrowseData
	<b>format</b> Character: response format as JSON (default), CSV or TSV
	<b>date</b> Character: dates of the data retrieval by Firebrowse (by default, it uses the most recent data available)
	<b>cohort</b> Character: abbreviation of the cohorts (by default, returns data for all cohorts)
	<b>data_type</b> Character: data types (optional)
	<b>tool</b> Character: data produced by the selected Firebrowse tools (optional)
	<b>platform</b> Character: data generation platforms (optional)
	<b>center</b> Character: data generation centres (optional)
	<b>level</b> Integer: data levels (optional)
	<b>protocol</b> Character: sample characterization protocols (optional)
	<b>page</b> Integer: page of the results to return (optional)
	<b>page_size</b> Integer: number of records per page of results; max is 2000 (optional)
	<b>sort_by</b> String: column used to sort the data (by default, it sorts by cohort)
download	Boolean: download missing files through the function download.file (TRUE by default)

### Value

URL of missing files ("missing" class) if files need to be downloaded and if the argument download is FALSE; else, a list with loaded data

**Examples**

```
## Not run:
loadFirebrowseData(cohort = "ACC", data_type = "Clinical")

## End(Not run)
```

---

loadFirebrowseFolders *Load Firebrowse folders*

---

**Description**

Loads the files present in each folder as a data.frame.

**Usage**

```
loadFirebrowseFolders(folder, exclude = "")
loadFirehoseFolders(folder, exclude = "")
loadTCGAfolders(folder, exclude = "")
```

**Arguments**

folder	Character: folder(s) in which to look for Firebrowse files
exclude	Character: files to exclude from the loading

**Value**

List with loaded data.frames

**Note**

For faster execution, this function uses the readr library. This function ignores subfolders of the given folder (which means that files inside subfolders are NOT loaded).

---

loadGeneExpressionSet *Set of functions to load splicing quantification*

---

**Description**

Instructions to build the Shiny app

**Usage**

```
loadGeneExpressionSet(session, input, output)
```

**Arguments**

session	Session object
input	Input object
output	Output object

**Value**

NULL (this function is used to modify the Shiny session's state)

---

loadGtexData	<i>Load GTEX data</i>
--------------	-----------------------

---

**Description**

Load GTEX data

**Usage**

```
loadGtexData(clinical = NULL, sampleMetadata = NULL,
             junctionQuant = NULL, geneExpr = NULL, tissue = NULL)
```

**Arguments**

clinical	Character: path to subject information (the TXT file)
sampleMetadata	Character: path to sample metadata (the TXT file)
junctionQuant	Character: path to junction quantification
geneExpr	Character: path to gene read counts, RPKMs or TPMs
tissue	Character: tissue(s) of interest when loading data (all tissues are loaded by default); if only some tissue(s) are of interest, this may speed up loading the data

**Value**

List with loaded data

---

loadGtexDataShiny	<i>Shiny wrapper to load GTEX data</i>
-------------------	----------------------------------------

---

**Description**

Shiny wrapper to load GTEX data

**Usage**

```
loadGtexDataShiny(session, input, replace = TRUE)
```

**Arguments**

session	Shiny session
input	Shiny input
replace	Boolean: replace loaded data? TRUE by default

**Value**

NULL (this function is used to modify the Shiny session's state)

---

loadGtexFile	<i>Load GTEX file</i>
--------------	-----------------------

---

**Description**

Load GTEX file

**Usage**

```
loadGtexFile(path, pattern, samples = NULL)
```

```
loadGTEXFile(path, pattern, samples = NULL)
```

**Arguments**

path	Character: path to file
pattern	Character: pattern of the format type to load file
samples	Character: samples to filter datasets

**Value**

Loaded file as a data frame

---

loadLocalFiles	<i>Load local files</i>
----------------	-------------------------

---

**Description**

Load local files

**Usage**

```
loadLocalFiles(folder, ignore = c(".aux.", ".mage-tab."),
  name = "Data")
```

**Arguments**

folder	Character: path to folder containing files of interest
ignore	Character: skip folders and filenames that match the expression
name	Character: name of the category containing all loaded datasets

**Value**

List of data frames from valid files

**Examples**

```
## Not run:
folder <- "~/Downloads/ACC 2016"
data <- loadLocalFiles(folder)

ignore <- c(".aux.", ".mage-tab.", "junction quantification")
loadLocalFiles(folder, ignore)

## End(Not run)
```

---

loadRequiredData	<i>Missing information modal template</i>
------------------	-------------------------------------------

---

**Description**

Missing information modal template

**Usage**

```
loadRequiredData(modal = NULL)

missingDataModal(session, dataType, buttonId)

missingDataGuide(dataType)
```

**Arguments**

modal	Character: modal identifier
session	Shiny session
dataType	Character: type of data missing
buttonId	Character: identifier of button to take user to load missing data

**Value**

NULL (this function is used to modify the Shiny session's state)

**Examples**

```
## Not run:
session <- session$ns
buttonInput <- "takeMeThere"
buttonId <- ns(buttonInput)
dataType <- "Inclusion levels"
missingDataModal(session, buttonId, dataType)
observeEvent(input[[buttonInput]], missingDataGuide(dataType))

## End(Not run)
```

loadSplicingQuantificationSet

*Set of functions to load splicing quantification*

---

### **Description**

Instructions to build the Shiny app

### **Usage**

```
loadSplicingQuantificationSet(session, input, output)
```

### **Arguments**

session	Session object
input	Input object
output	Output object

### **Value**

NULL (this function is used to modify the Shiny session's state)

---

loadSRAproject

*Download and load SRA projects*

---

### **Description**

Download and load SRA projects

### **Usage**

```
loadSRAproject(project, outdir = getDownloadsFolder())
```

### **Arguments**

project	Character: SRA project identifiers to download
outdir	Character: directory to store the downloaded files

### **Value**

List containing downloaded projects

---

`loadTCGAsampleMetadata`*Prepare TCGA sample metadata from loaded datasets*

---

**Description**

If no TCGA datasets apply, the input is returned

**Usage**`loadTCGAsampleMetadata(data)`**Arguments**

`data` List of list of data frames

**Value**

List of list of data frames

---

`matchGroupPatientsAndSamples`*Match patients and samples in a group*

---

**Description**

Match patients and samples in a group

**Usage**`matchGroupPatientsAndSamples(id, group)`**Arguments**

`id` Character: identifier (Patients or Samples)

`group` Data frame: group containing either Patients or Samples

**Value**

Data frame with groups containing matching patients and samples

---

matchSplicingEventsWithGenes  
*Match splicing events with respective genes*

---

**Description**

Match splicing events with respective genes

**Usage**

```
matchSplicingEventsWithGenes(ASevents)
```

**Arguments**

ASevents            Character: alternative splicing events to be matched

**Value**

Named character vector containing the splicing events and their respective gene as their name

---

modTabPanel            *Modified tabPanel function to show icon and title*

---

**Description**

Modified tabPanel function to show icon and title

**Usage**

```
modTabPanel(title, ..., icon = NULL, menu = FALSE)
```

**Arguments**

title            Character: title of the tab  
 ...            HTML elements to render  
 icon            Character: name of the icon  
 menu            Boolean: create a dropdown menu-like tab? FALSE by default

**Value**

HTML interface

**Note**

Icon is hidden at small viewports



---

navSelectize	<i>Create a special selectize input in the navigation bar</i>
--------------	---------------------------------------------------------------

---

**Description**

Create a special selectize input in the navigation bar

**Usage**

```
navSelectize(id, label, placeholder = label)
```

**Arguments**

id	Character: input identifier
label	Character: input label
placeholder	Character: input placeholder

**Value**

HTML element to be included in a navigation bar

---

noinfo	<i>Interface when no information could be retrieved</i>
--------	---------------------------------------------------------

---

**Description**

Interface when no information could be retrieved

**Usage**

```
noinfo(output,
  description = paste("No information available for this gene."), ...)
```

**Arguments**

output	Shiny output
description	Character: description of the message to show to the user
...	Arguments passed on to <code>inlineDialog</code>
<b>id</b>	Character: identifier (NULL by default)
<b>buttonId</b>	Character: button identifier (NULL by default)
<b>buttonLabel</b>	Character: button label (NULL by default)
<b>buttonIcon</b>	Character: button icon (NULL by default)
<b>type</b>	Character: type of alert (error or warning)
<b>bigger</b>	Boolean: wrap the description in a h4 tag?

**Value**

NULL (this function is used to modify the Shiny session's state)

---

normaliseGeneExpression

*Filter and normalise gene expression*

---

### Description

Filter and normalise gene expression

### Usage

```
normaliseGeneExpression(geneExpr, geneFilter = NULL, method = "TMM",
  p = 0.75, log2transform = TRUE, priorCount = 0.25)
```

### Arguments

geneExpr	Matrix or data frame: gene expression
geneFilter	Boolean: filtered genes
method	normalization method to be used
p	percentile (between 0 and 1) of the counts that is aligned when method="upperquartile"
log2transform	Boolean: perform log2-transformation?
priorCount	Average count to add to each observation to avoid zeroes after log-transformation

### Value

Gene expression filtered and normalised

### Examples

```
geneExpr <- readRDS("ex_gene_expression.RDS")
normaliseGeneExpression(geneExpr)
```

---

operateOnGroups

*Set operations on groups*

---

### Description

This function can be used on groups to merge, intersect, subtract, etc.

### Usage

```
operateOnGroups(input, session, operation, buttonId, symbol = " ", type,
  sharedData = sharedData)
```

**Arguments**

input	Shiny input
session	Shiny session
operation	Character: set operation
buttonId	Character: ID of the button to trigger operation
symbol	Character: Unicode symbol to visually indicate the operation performed (" " by default)
type	Character: type of group where set operations are to be performed
sharedData	Shiny app's global variable

**Value**

NULL (this function is used to modify the Shiny session's state)

---

optimalSurvivalCutoff *Calculate optimal data cutoff that best separates survival curves*

---

**Description**

Uses `stats::optim` with the Brent method to test multiple cutoffs and to find the minimum log-rank p-value.

**Usage**

```
optimalSurvivalCutoff(clinical, data, censoring, event, timeStart,
  timeStop = NULL, followup = "days_to_last_followup",
  session = NULL, filter = TRUE, survTime = NULL, lower = NULL,
  upper = NULL)
```

```
optimalPSIcutoff(clinical, psi, censoring, event, timeStart,
  timeStop = NULL, followup = "days_to_last_followup",
  session = NULL, filter = TRUE, survTime = NULL)
```

**Arguments**

clinical	Data frame: clinical data
data	Numeric: data values
censoring	Character: censor using "left", "right", "interval" or "interval2"
event	Character: name of column containing time of the event of interest
timeStart	Character: name of column containing starting time of the interval or follow up time
timeStop	Character: name of column containing ending time of the interval (only relevant for interval censoring)
followup	Character: name of column containing follow up time
session	Shiny session (only used for the visual interface)
filter	Boolean or numeric: elements to use (all by default)

`survTime`      `survTime` object: times to follow up, time start, time stop and event (optional)  
`lower, upper`    Bounds in which to search (if NULL, they will be automatically set to 0 and 1 if all data values are within that interval; otherwise, they will be set to the minimum and maximum values of data)  
`psi`              Numeric: PSI values to test against the cutoff

**Value**

List containing the optimal cutoff (`par`) and the corresponding p-value (`value`)

**Examples**

```

clinical <- read.table(text = "2549  NA ii  female
                             840  NA i   female
                             NA 1204 iv  male
                             NA  383 iv  female
                             1293  NA iii male
                             NA 1355 ii  male")
names(clinical) <- c("patient.days_to_last_followup",
                    "patient.days_to_death",
                    "patient.stage_event.pathologic_stage",
                    "patient.gender")
timeStart <- "days_to_death"
event     <- "days_to_death"

psi <- c(0.1, 0.2, 0.9, 1, 0.2, 0.6)
opt <- optimalSurvivalCutoff(clinical, psi, "right", event, timeStart)

```

---

<code>optimSurvDiffSet</code>	<i>Optimal survival difference given an inclusion level cutoff for a specific alternative splicing event</i>
-------------------------------	--------------------------------------------------------------------------------------------------------------

---

**Description**

Optimal survival difference given an inclusion level cutoff for a specific alternative splicing event

**Usage**

```
optimSurvDiffSet(session, input, output)
```

**Arguments**

<code>session</code>	Shiny session
<code>input</code>	Shiny input
<code>output</code>	Shiny output

**Value**

NULL (this function is used to modify the Shiny session's state) Calculate optimal survival cutoff for the inclusion levels of a given alternative splicing event

---

`parseCategoricalGroups`*Parse categorical columns in a data frame*

---

**Description**

Retrieve elements grouped by their unique group based on each categorical column

**Usage**

```
parseCategoricalGroups(df)
```

**Arguments**

df                      Data frame

**Value**

List of lists containing values based on rownames of df

**See Also**

[testGroupIndependence](#) and [plotGroupIndependence](#)

**Examples**

```
df <- data.frame("race"=c("caucasian", "caucasian", "asian"),
                 "gender"=c("male", "female", "male"))
rownames(df) <- paste("patient", 1:3)
parseCategoricalGroups(df)
```

---

`parseDateResponse`*Parse the date from a response*

---

**Description**

Parse the date from a response

**Usage**

```
parseDateResponse(string)
```

**Arguments**

string                  Character: dates

**Value**

Parsed date

---

parseFirebrowseMetadata

*Query the Firebrowse web API for metadata*

---

### Description

Query the Firebrowse web API for metadata

### Usage

```
parseFirebrowseMetadata(type, ...)
```

```
parseFirehoseMetadata(type, ...)
```

```
parseTCGAMetadata(type, ...)
```

### Arguments

type	Character: metadata to retrieve
...	Character: parameters to pass to query (optional)

### Value

List with parsed response

### Examples

```
psychomics:::parseFirebrowseMetadata("Dates")
psychomics:::parseFirebrowseMetadata("Centers")
psychomics:::parseFirebrowseMetadata("HeartBeat")

# Get the abbreviation and description of all cohorts available
psychomics:::parseFirebrowseMetadata("Cohorts")
# Get the abbreviation and description of the selected cohorts
psychomics:::parseFirebrowseMetadata("Cohorts", cohort = c("ACC", "BRCA"))
```

---

parseMatsEvent

*Parse alternative splicing events from MATS*

---

### Description

Parse alternative splicing events from MATS

### Usage

```
parseMatsEvent(event, event_type)
```

### Arguments

event	Data frame row: MATS splicing event
event_type	Character: Type of event to parse (see details)

**Details**

The following event types can be parsed:

- **SE**: Skipped exon
- **MXE**: Mutually exclusive exons
- **RI**: Retained intron
- **A3SS**: Alternative 3' splice site
- **A5SS**: Alternative 5' splice site

**Value**

List containing the event attributes and junctions

**Examples**

```
# MATS event (alternative 3' splice site)
event <- read.table(text = "
  2 ENSG00000166012 TAF1D chr11 - 93466515 93466671 93466515 93466563 93467790 93467826
  5 ENSG00000166012 TAF1D chr11 - 93466515 93466671 93466515 93466585 93467790 93467826
  6 ENSG00000166012 TAF1D chr11 - 93466515 93466585 93466515 93466563 93467790 93467826
")
psychomics:::parseMatsEvent(event, "A3SS")
```

---

parseMatsGeneric	<i>Parse junctions of an alternative splicing event from MATS according to event type</i>
------------------	-------------------------------------------------------------------------------------------

---

**Description**

Parse junctions of an alternative splicing event from MATS according to event type

**Usage**

```
parseMatsGeneric(junctions, strand, coords, plus_pos, minus_pos)
parseMatsSE(junctions, strand)
parseMatsMXE(junctions, strand)
parseMatsRI(junctions, strand)
parseMatsA3SS(junctions, strand)
parseMatsA5SS(junctions, strand)
parseMatsAFE(junctions, strand)
parseMatsALE(junctions, strand)
```

**Arguments**

junctions	Integer: event's junctions
strand	Character: strand of the event
coords	Character: names of the alternative splicing coordinates
plus_pos	Integer: match of each junction in the respective coordinate for the plus strand
minus_pos	Integer: match of each junction in the respective coordinate for the minus strand

**Details**

The following event types are ready to be parsed:

- **SE** (skipped exon)
- **MXE** (mutually exclusive exon)
- **RI** (intron retention)
- **A5SS** (alternative 5' splice site)
- **A3SS** (alternative 3' splice site)
- **AFE** (alternative first exon)
- **ALE** (alternative last exon)

You can use `parseMatsGeneric` to parse other event types.

**Value**

Data frame with parsed junctions

**See Also**

[parseMatsEvent](#)

**Examples**

```
# Parse generic event (in this case, an exon skipping event)
junctions <- read.table(text=
  "79685787 79685910 79685796 79685910 79679566 79679751")
coords <- c("A1.start", "A1.end",
           "C1.start", "C1.end",
           "C2.start", "C2.end")
plus <- c(1:6)
minus <- c(2:1, 6:3)
psychomics:::parseMatsGeneric(junctions, strand = "+", coords, plus, minus)

# Parse exon skipping event
junctions <- read.table(text=
  "79685787 79685910 79685796 79685910 79679566 79679751")
psychomics:::parseMatsSE(junctions, strand = "+")

# Parse mutually exclusive exon event
junctions <- read.table(text=
  "158282161 158282276 158282689 158282804 158281047 158281295 158283950 158284199")
psychomics:::parseMatsMXE(junctions, strand = "+")

# Parse intron retention event
```



```

junctions <- read.table(text=
  "15929853 15932100 15929853 15930016 15930687 15932100")
psychomics:::parseMatsRI(junctions, strand = "+")

# Parse alternative 3' splicing site event
junctions <- read.table(text=
  "79685787 79685910 79685796 79685910 79679566 79679751")
psychomics:::parseMatsA3SS(junctions, strand = "+")

# Parse alternative 5' splicing site event
junctions <- read.table(text=
  "102884421 102884501 102884421 102884489 102884812 102885881")
psychomics:::parseMatsA5SS(junctions, strand = "+")

# Parse alternative first exon event
junctions <- read.table(text=
  "16308723 16308879 16308967 16309119 16314269 16314426")
psychomics:::parseMatsAFE(junctions, strand = "+")

# Parse alternative last exon event
junctions <- read.table(text=
  "111858645 111858828 111851063 111851921 111850441 111850543")
psychomics:::parseMatsAFE(junctions, strand = "+")

```

---

parseMisoEvent

*Parse an alternative splicing event from MISO*

---

## Description

Parse an alternative splicing event from MISO

## Usage

```
parseMisoEvent(event)
```

## Arguments

event	Data.frame containing only one event with at least 7 columns as retrieved from the alternative splicing annotation files from MISO (GFF3 files)
-------	-------------------------------------------------------------------------------------------------------------------------------------------------

## Details

More information about MISO available at <http://miso.readthedocs.org>

## Value

List with event attributes and junction positions for the exons (depends on the events)

**Examples**

```
# example of alternative splicing event: skipped exon (SE)
event <- read.table(text = "
chr1 SE gene 16854 18061 . - .
chr1 SE mRNA 16854 18061 . - .
chr1 SE exon 16854 17055 . - .
chr1 SE exon 17233 17742 . - .
chr1 SE exon 17915 18061 . - .
chr1 SE mRNA 16854 18061 . - .
chr1 SE exon 16854 17955 . - .
chr1 SE exon 17915 18061 . - .")
psychomics:::parseMisoEvent(event)
```

---

parseMisoEventID	<i>Match MISO's splicing event IDs with the IDs present in the alternative splicing annotation file and get events in a data frame</i>
------------------	----------------------------------------------------------------------------------------------------------------------------------------

---

**Description**

Match MISO's splicing event IDs with the IDs present in the alternative splicing annotation file and get events in a data frame

**Usage**

```
parseMisoEventID(eventID, annotation, IDcolumn)
```

**Arguments**

eventID	Character: alternative event IDs
annotation	Data.frame: alternative event annotation file
IDcolumn	Integer: index of the column with the event ID's in the alternative event annotation file

**Details**

For faster execution times, provide a vector of event IDs.

For more information about MISO, see <http://miso.readthedocs.org>.

**Value**

Data frame of the matching events (or NA when nothing is matched)

**Note**

If possible, it's recommend to use smaller subsets of the alternative events' annotation instead of all data for faster runs. For example, when trying to match only skipped exons event IDs, only use the annotation of skipped exons instead of using a mega annotation with all event types.

**Examples**

```

eventID <- c("114785@uc001sok.1@uc001soj.1", "114784@uc001bxm.1@uc001bxn.1")
# the annotation is one of the GFF3 files needed to run MISO
gff3 <- system.file("extdata", "miso_AS_annot_example.gff3",
                    package="psychomics")
annotation <- read.delim(gff3, header=FALSE, comment.char="#")
IDcolumn <- 9
psychomics:::parseMisoEventID(eventID, annotation, IDcolumn)

```

---

parseMisoGeneric	<i>Parse junctions of an event from MISO according to event type</i>
------------------	----------------------------------------------------------------------

---

**Description**

Parse junctions of an event from MISO according to event type

**Usage**

```

parseMisoGeneric(event, validator, eventType, coord, plusIndex, minusIndex)
parseMisoSE(event)
parseMisoMXE(event)
parseMisoRI(event, strand)
parseMisoA5SS(event)
parseMisoA3SS(event, plusIndex, minusIndex)
parseMisoTandemUTR(event, minusIndex)
parseMisoAFE(event)
parseMisoALE(event)

```

**Arguments**

event	Data.frame containing only one event with at least 7 columns as retrieved from the alternative splicing annotation files from MISO (GFF3 files)
validator	Character: valid elements for each event
eventType	Character: event type (see details for available events)
coord	Character: coordinate positions to fill
plusIndex	Integer: index of the coordinates for a plus strand event
minusIndex	Integer: index of the coordinates for a minus strand event
strand	Character: "+" or "-" strand

**Details**

The following event types are available to be parsed:

- **SE** (exon skipping)
- **MXE** (mutually exclusive exon)
- **RI** (intron retention)
- **A5SS** (alternative 5' splice site)
- **A3SS** (alternative 3' splice site)
- **AFE** (alternative first exon)
- **ALE** (alternative last exon)
- **Tandem UTR**

**Value**

List of parsed junctions

**See Also**

[parseMisoEvent](#)

**Examples**

```
# skipped exon event (SE)
event <- read.table(text = "
chr1 SE gene 16854 18061 . - .
chr1 SE mRNA 16854 18061 . - .
chr1 SE exon 16854 17055 . - .
chr1 SE exon 17233 17742 . - .
chr1 SE exon 17915 18061 . - .
chr1 SE mRNA 16854 18061 . - .
chr1 SE exon 16854 17955 . - .
chr1 SE exon 17915 18061 . - .")
psychomics:::parseMisoSE(event)

# mutually exclusive exon (MXE) event
event <- read.table(text = "
chr1 MXE gene 764383 788090 . + .
chr1 MXE mRNA 764383 788090 . + .
chr1 MXE exon 764383 764484 . + .
chr1 MXE exon 776580 776753 . + .
chr1 MXE exon 787307 788090 . + .
chr1 MXE mRNA 764383 788090 . + .
chr1 MXE exon 764383 764484 . + .
chr1 MXE exon 783034 783186 . + .
chr1 MXE exon 787307 788090 . + .")
psychomics:::parseMisoMXE(event)

# intron retention (RI) event
event <- read.table(text = "
chr1 RI gene 17233 17742 . - .
chr1 RI mRNA 17233 17742 . - .
chr1 RI exon 17233 17742 . - .
chr1 RI mRNA 17233 17742 . - .")
```

```
chr1 RI exon 17233 17364 . - .
chr1 RI exon 17601 17742 . - .")
psychomics:::parseMisoRI(event)

# alternative 5' splice site (A5SS) event
event <- read.table(text = "
chr1 A5SS gene 17233 17742 . - .
chr1 A5SS mRNA 17233 17742 . - .
chr1 A5SS exon 17233 17368 . - .
chr1 A5SS exon 17526 17742 . - .
chr1 A5SS mRNA 17233 17742 . - .
chr1 A5SS exon 17233 17368 . - .
chr1 A5SS exon 17606 17742 . - .")
psychomics:::parseMisoA5SS(event)

# alternative 3' splice site (A3SS) event
event <- read.table(text = "
chr1 A3SS gene 15796 16765 . - .
chr1 A3SS mRNA 15796 16765 . - .
chr1 A3SS exon 15796 15947 . - .
chr1 A3SS exon 16607 16765 . - .
chr1 A3SS mRNA 15796 16765 . - .
chr1 A3SS exon 15796 15942 . - .
chr1 A3SS exon 16607 16765 . - .")
psychomics:::parseMisoA3SS(event)

# Tandem UTR event
event <- read.table(text = "
chr19 TandemUTR gene 10663759 10664625 . - .
chr19 TandemUTR mRNA 10663759 10664625 . - .
chr19 TandemUTR exon 10663759 10664625 . - .
chr19 TandemUTR mRNA 10664223 10664625 . - .
chr19 TandemUTR exon 10664223 10664625 . - .")
psychomics:::parseMisoTandemUTR(event)

# alternative first exon (AFE) event
event <- read.table(text = "
chr12 AFE gene 57916659 57920171 . + .
chr12 AFE mRNA 57919131 57920171 . + .
chr12 AFE exon 57919131 57920171 . + .
chr12 AFE mRNA 57916659 57918199 . + .
chr12 AFE exon 57916659 57916794 . + .
chr12 AFE exon 57917812 57917875 . + .
chr12 AFE exon 57918063 57918199 . + .")
psychomics:::parseMisoAFE(event)

# alternative last exon (ALE) event
event <- read.table(text = "
chr6 ALE gene 30620579 30822593 . + .
chr6 ALE mRNA 30822190 30822593 . + .
chr6 ALE exon 30822190 30822593 . + .
chr6 ALE mRNA 30620579 30620982 . + .
chr6 ALE exon 30620579 30620982 . + .")
psychomics:::parseMisoALE(event)
```

---

parseMisoId                    *Parse MISO's alternative splicing event identifier*

---

**Description**

Parse MISO's alternative splicing event identifier

**Usage**

```
parseMisoId(id)
```

**Arguments**

id                            Character: MISO alternative splicing event identifier

**Value**

Character with the parsed ID

**Examples**

```
id <- paste0(
  "ID=ENSMUSG00000026150.chr1:82723803:82723911:+@chr1:82724642:82724813:",
  "+@chr1:82725791:82726011:+.B;Parent=ENSMUSG00000026150.chr1:82723803:",
  "82723911:+@chr1:82724642:82724813:+@chr1:82725791:82726011:+")
psychomics:::parseMisoId(id)
```

---

parseSampleGroups            *Return the type of a given sample*

---

**Description**

Return the type of a given sample

**Usage**

```
parseSampleGroups(sample, filename = system.file("extdata",
  "TCGAsampleType.RDS", package = "psychomics"))
```

**Arguments**

sample                      Character: ID of the sample  
 filename                    Character: path to RDS file containing corresponding type

**Value**

Types of the TCGA samples

**Examples**

```
parseSampleGroups(c("TCGA-01A-Tumour", "TCGA-10B-Normal"))
```

---

parseSplicingEvent     *Parse an alternative splicing event based on a given identifier*

---

### Description

Parse an alternative splicing event based on a given identifier

### Usage

```
parseSplicingEvent(event, char = FALSE, pretty = FALSE, extra = NULL,
  coords = FALSE)
```

### Arguments

event	Character: event identifier
char	Boolean: return a single character instead of list with parsed values?
pretty	Boolean: return a prettier name of the event identifier?
extra	Character: extra information to add (such as species and assembly version); only used if pretty and char are TRUE
coords	Boolean: extra coordinates regarding the alternative and constitutive regions of alternative splicing events; only used if char is FALSE

### Value

Parsed event

### Examples

```
events <- c("SE_1_-_123_456_789_1024_TST",
  "MXE_3+_473_578_686_736_834_937_HEY/YOU")
parseSplicingEvent(events)
```

---

parseSuppaAnnotation     *Get events from alternative splicing annotation*

---

### Description

Get events from alternative splicing annotation

### Usage

```
parseSuppaAnnotation(folder, types = c("SE", "AF", "AL", "MX", "A5",
  "A3", "RI"), genome = "hg19")

parseVastToolsAnnotation(folder, types = c("ALT3", "ALT5", "COMBI", "IR",
  "MERGE3m", "MIC", "EXSK", "MULTI"), genome = "Hsa",
  complexEvents = FALSE)

parseMisoAnnotation(folder, types = c("SE", "AFE", "ALE", "MXE", "A5SS",
```

```
"A3SS", "RI", "TandemUTR"), genome = "hg19")

parseMatsAnnotation(folder, types = c("SE", "AFE", "ALE", "MXE", "A5SS",
  "A3SS", "RI"), genome = "fromGTF", novelEvents = TRUE)
```

### Arguments

folder	Character: path to folder
types	Character: type of events to retrieve (depends on the program of origin; see details)
genome	Character: genome of interest (for instance, hg19; depends on the program of origin)
complexEvents	Boolean: should complex events in A3SS and A5SS be parsed? FALSE by default
novelEvents	Boolean: parse events dedected due to novel splice sites (TRUE by default)

### Details

Type of parsable events:

- Alternative 3' splice site
- Alternative 5' splice site
- Alternative first exon
- Alternative last exon
- Skipped exon (may include skipped micro-exons)
- Mutually exclusive exon
- Retained intron
- Tandem UTR

### Value

Retrieve data frame with events based on a given alternative splicing annotation

### Examples

```
# Load sample files
folder <- "extdata/eventsAnnotSample/suppa_output/suppaEvents"
suppaOutput <- system.file(folder, package="psychomics")

suppa <- parseSuppaAnnotation(suppaOutput)
# Load sample files
folder <- "extdata/eventsAnnotSample/VASTDB/Hsa/TEMPLATES"
vastToolsOutput <- system.file(folder, package="psychomics")

vast <- parseVastToolsAnnotation(vastToolsOutput)
# Load sample files
folder <- "extdata/eventsAnnotSample/miso_annotation"
misoOutput <- system.file(folder, package="psychomics")

miso <- parseMisoAnnotation(misoOutput)
# Load sample files
folder <- "extdata/eventsAnnotSample/mats_output/ASEvents"
```



```
matsOutput <- system.file(folder, package="psychomics")  
  
mats <- parseMatsAnnotation(matsOutput)  
  
# Do not parse novel events  
mats <- parseMatsAnnotation(matsOutput, novelEvents=FALSE)
```

---

parseSuppaEvent	<i>Parses splicing events of a specific event type from SUPPA</i>
-----------------	-------------------------------------------------------------------

---

## Description

Parses splicing events of a specific event type from SUPPA

## Usage

```
parseSuppaEvent(event)
```

## Arguments

event                    Character vector: Splicing event attributes and junction positions

## Details

More information about SUPPA available at <https://bitbucket.org/regulatorygenomicsupf/suppa>

The following event types are available to be parsed:

- **SE** (skipped exon)
- **RI** (intron retention)
- **MX** (mutually exclusive exons)
- **A5** (alternative 5' splice site)
- **A3** (alternative 3' splice site)
- **AL** (alternative last exon)
- **AF** (alternative first exon)

## Value

List with the event attributes (chromosome, strand, event type and the position of the exon boundaries)

## Note

It only allows to parse one event type at once.

## Examples

```
event <- "ENSG00000000419;A3:20:49557492-49557642:49557470-49557642:-"  
psychomics:::parseSuppaEvent(event)
```

---

parseSuppaGeneric      *Parse junctions of an event from SUPPA*

---

### Description

Parse junctions of an event from SUPPA

### Usage

```
parseSuppaGeneric(junctions, strand, coords, plus_pos, minus_pos)
```

```
parseSuppaSE(junctions, strand)
```

```
parseSuppaRI(junctions, strand)
```

```
parseSuppaALE(junctions, strand)
```

```
parseSuppaAFE(junctions, strand)
```

```
parseSuppaMXE(junctions, strand)
```

```
parseSuppaA3SS(junctions, strand)
```

```
parseSuppaA5SS(junctions, strand)
```

### Arguments

junctions	List of integers: exon-exon junctions of an event
strand	Character: positive "+" or negative "-" strand
coords	Character: coordinate positions to fill
plus_pos	Integer: index of the coordinates for a plus strand event
minus_pos	Integer: index of the coordinates for a minus strand event

### Details

The following event types are available to be parsed:

- **SE** (exon skipping)
- **RI** (intron retention)
- **MXE** (mutually exclusive exons)
- **A5SS** (alternative 5' splice site)
- **A3SS** (alternative 3' splice site)
- **ALE** (alternative last exon)
- **AFE** (alternative first exon)

### Value

Data frame of parsed junctions

**See Also**[parseSuppaEvent](#)**Examples**

```
# Parse generic event (in this case, an exon skipping event)
junctions <- read.table(text = "169768099 169770024 169770112 169771762")
coords <- c("C1.end", "A1.start", "A1.end", "C2.start")
plus <- 1:4
minus <- 1:4
psychomics:::parseSuppaGeneric(junctions, strand = "+", coords, plus, minus)

junctions <- read.table(text = "169768099 169770024 169770112 169771762")
psychomics:::parseSuppaSE(junctions, "+")

junctions <- read.table(text = "196709749 196709922 196711005 196711181")
psychomics:::parseSuppaRI(junctions, "+")

junctions <- read.table(
  text = "24790610 24792494 24792800 24790610 24795476 24795797")
psychomics:::parseSuppaALE(junctions, "+")

junctions <- read.table(
  text = "169763871 169764046 169767998 169764550 169765124 169767998")
psychomics:::parseSuppaAFE(junctions, "+")

junctions <- read.table(
  text = "202060671 202068453 202068489 202073793 202060671 202072798 202072906 202073793")
psychomics:::parseSuppaMXE(junctions, "+")

junctions <- read.table(text = "169772450 169773216 169772450 169773253")
psychomics:::parseSuppaA3SS(junctions, "+")

junctions <- read.table(text = "50193276 50197008 50192997 50197008")
psychomics:::parseSuppaA5SS(junctions, "+")
```

---

parseTcgaSampleInfo    *Parse sample information from TCGA samples*

---

**Description**

Parse sample information from TCGA samples

**Usage**

```
parseTcgaSampleInfo(samples, match = NULL)
```

```
parseTCGAsampleInfo(samples, match = NULL)
```

**Arguments**

samples	Character: sample identifiers
match	Integer: match between samples and patients (NULL by default; performs the match)

**Value**

Data frame containing metadata associated with each TCGA sample

**Examples**

```
samples <- c("TCGA-3C-AAAU-01A-11R-A41B-07", "TCGA-3C-AALI-01A-11R-A41B-07",
            "TCGA-3C-AALJ-01A-31R-A41B-07", "TCGA-3C-AALK-01A-11R-A41B-07",
            "TCGA-4H-AAAK-01A-12R-A41B-07", "TCGA-5L-AAT0-01A-12R-A41B-07")

parseTcgaSampleInfo(samples)
```

---

parseUniprotXML      *Parse XML from UniProt's RESTful service*

---

**Description**

Parse XML from UniProt's RESTful service

**Usage**

```
parseUniprotXML(xml)
```

**Arguments**

xml                      response from UniProt

**Value**

List containing protein length and data frame of protein features

---

parseUrlsFromFirebrowseResponse  
*Retrieve URLs from a response to a Firebrowse data query*

---

**Description**

Retrieve URLs from a response to a Firebrowse data query

**Usage**

```
parseUrlsFromFirebrowseResponse(res)
```

```
parseUrlsFromFirehoseResponse(res)
```

**Arguments**

res                      Response from `http://` GET to a Firebrowse data query

**Value**

Named character with URLs

**Examples**

```
res <- psychomics:::queryFirebrowseData(cohort = "ACC")
url <- psychomics:::parseUrlsFromFirebrowseResponse(res)
```

---

parseValidFile      *Parse file given a list of file formats*

---

**Description**

Tries to recognise the file format and parses the content of the given file accordingly.

**Usage**

```
parseValidFile(file, formats, ...)
```

**Arguments**

file	Character: file to parse
formats	List of file formats to check
...	Extra parameters passed to <a href="#">fread</a>

**Details**

The resulting data frame includes the attribute `tablename` with the name of the data frame

**Value**

Data frame with the contents of the given file if the file format is recognised; otherwise, returns NULL

---

parseVastToolsEvent      *Parses an alternative splicing event from VAST-TOOLS*

---

**Description**

Parses an alternative splicing event from VAST-TOOLS

**Usage**

```
parseVastToolsEvent(event)
```

**Arguments**

event	Data.frame: VAST-TOOLS event containing gene symbol, event ID, length, junctions coordinates, event type and inclusion levels for both samples
-------	------------------------------------------------------------------------------------------------------------------------------------------------

**Details**

Junctions are parsed from

**Value**

List with the event attributes (chromosome, strand, event type and the position of the exon boundaries)

**Note**

Only supports to parse one event at a time.

**Examples**

```
event <- read.table(text =
"NFYA HsaEX0042823 chr6:41046768-41046903 136 chr6:41040823,41046768-41046903,41051785 C2 0 N 0 N"
)
psychomics:::parseVastToolsEvent(event)
```

---

parseVastToolsSE	<i>Parse junctions of an event from VAST-TOOLS according to event type</i>
------------------	----------------------------------------------------------------------------

---

**Description**

Parse junctions of an event from VAST-TOOLS according to event type

**Usage**

```
parseVastToolsSE(junctions)
parseVastToolsRI(junctions, strand)
parseVastToolsA3SS(junctions)
parseVastToolsA5SS(junctions)
```

**Arguments**

junctions	Data.frame or matrix: exon-exon junctions of alternative splicing events (it must have 4 columns)
strand	Character: positive (+) or negative (-) strand

**Details**

The following event types are available to be parsed:

- **SE** (skipped exon)
- **RI** (intron retention)
- **A5SS** (alternative 5' splice site)
- **A3SS** (alternative 3' splice site)

**Value**

List of parsed junctions

**See Also**[parseVastToolsEvent](#)**Examples**

```
junctions <- read.table(text = "41040823 41046768 41046903 41051785")
psychomics:::parseVastToolsSE(junctions)

# these functions are vectorised!
junctions <- read.table(text = "41040823 41046768 41046903 41051785
                               58864658 58864693 58864294 58864563")
psychomics:::parseVastToolsSE(junctions)

junctions <- read.table(text = "58864658 58864693 58864294 58864563")
psychomics:::parseVastToolsRI(junctions, strand = "+")

junctions <- rbind(
  c(36276385, list(c(36277798, 36277315)), 36277974),
  c(7133604, 7133377, list(c(7133474, 7133456)))
)
psychomics:::parseVastToolsA3SS(junctions)

junctions <- rbind(
  c(74650610, list(c(74650654, 74650658)), 74650982),
  c(list(c(49557666, 49557642), 49557746, 49557470))
)
psychomics:::parseVastToolsA5SS(junctions)
```

---

patientMultiMatchWarning

*Helper text to explain what happens when a patient matches multiple samples when performing survival analysis*

---

**Description**

Helper text to explain what happens when a patient matches multiple samples when performing survival analysis

**Usage**

```
patientMultiMatchWarning()
```

**Value**

Character

---

performICA	<i>Perform independent component analysis after processing missing values</i>
------------	-------------------------------------------------------------------------------

---

**Description**

Perform independent component analysis after processing missing values

**Usage**

```
performICA(data, n.comp = min(5, ncol(data)), center = TRUE,
  scale. = FALSE, missingValues = round(0.05 * nrow(data)),
  alg.typ = c("parallel", "defaltion"), fun = c("logcosh", "exp"),
  alpha = 1, ...)
```

**Arguments**

data	an optional data frame (or similar: see <a href="#">model.frame</a> ) containing the variables in the formula formula. By default the variables are taken from environment(formula).
n.comp	number of components to be extracted
center	a logical value indicating whether the variables should be shifted to be zero centered. Alternately, a vector of length equal the number of columns of x can be supplied. The value is passed to <code>scale</code> .
scale.	a logical value indicating whether the variables should be scaled to have unit variance before the analysis takes place. The default is FALSE for consistency with S, but in general scaling is advisable. Alternatively, a vector of length equal the number of columns of x can be supplied. The value is passed to <code>scale</code> .
missingValues	Integer: number of tolerated missing values per column to be replaced with the mean of the values of that same column (5 rows by default)
alg.typ	if <code>alg.typ == "parallel"</code> the components are extracted simultaneously (the default). if <code>alg.typ == "deflation"</code> the components are extracted one at a time.
fun	the functional form of the $G$ function used in the approximation to neg-entropy (see 'details').
alpha	constant in range [1, 2] used in approximation to neg-entropy when <code>fun == "logcosh"</code>
...	Arguments passed on to <code>fastICA::fastICA</code>

**Value**

ICA result in a `prcomp` object

**See Also**

[plotICA](#), [performPCA](#) and [plotPCA](#)

**Examples**

```
performICA(USArrests)
```



---

performPCA	<i>Perform principal component analysis after processing missing values</i>
------------	-----------------------------------------------------------------------------

---

### Description

Perform principal component analysis after processing missing values

### Usage

```
performPCA(data, center = TRUE, scale. = FALSE,  
  missingValues = round(0.05 * nrow(data)), ...)
```

### Arguments

data	an optional data frame (or similar: see <a href="#">model.frame</a> ) containing the variables in the formula formula. By default the variables are taken from <code>environment(formula)</code> .
center	a logical value indicating whether the variables should be shifted to be zero centered. Alternately, a vector of length equal the number of columns of x can be supplied. The value is passed to <code>scale</code> .
scale.	a logical value indicating whether the variables should be scaled to have unit variance before the analysis takes place. The default is FALSE for consistency with S, but in general scaling is advisable. Alternatively, a vector of length equal the number of columns of x can be supplied. The value is passed to <a href="#">scale</a> .
missingValues	Integer: number of tolerated missing values per column to be replaced with the mean of the values of that same column (5 rows by default)
...	Arguments passed on to <code>stats::prcomp</code>

### Value

PCA result in a `prcomp` object

### See Also

[plotPCA](#), [performICA](#) and [plotICA](#)

### Examples

```
performPCA(USArrests)
```

---

plotClusters	<i>Add clusters to highchart object</i>
--------------	-----------------------------------------

---

**Description**

Clusters are added as coloured polygons.

**Usage**

```
plotClusters(hc, data, clustering)
```

**Arguments**

hc	highchart object
data	Data frame
clustering	Character: group of each sample

**Value**

highcharter object

---

plotCorrelation	<i>Plot correlations</i>
-----------------	--------------------------

---

**Description**

Plot correlation results from [correlateGEandAS](#)

**Usage**

```
plotCorrelation(corr, autoZoom = FALSE, loessSmooth = TRUE,
  loessFamily = c("gaussian", "symmetric"), colour = "black",
  alpha = 0.2, size = 1.5, loessColour = "red", loessAlpha = 1,
  loessWidth = 0.5, fontSize = 12, ..., colourGroups = NULL,
  legend = FALSE, showAllData = TRUE, density = FALSE,
  densityColour = "blue", densityWidth = 0.5)

## S3 method for class 'GEandAScorrelation'
plot(corr, autoZoom = FALSE,
  loessSmooth = TRUE, loessFamily = c("gaussian", "symmetric"),
  colour = "black", alpha = 0.2, size = 1.5, loessColour = "red",
  loessAlpha = 1, loessWidth = 0.5, fontSize = 12, ...,
  colourGroups = NULL, legend = FALSE, showAllData = TRUE,
  density = FALSE, densityColour = "blue", densityWidth = 0.5)
```

**Arguments**

corr	List of correlations
autoZoom	Boolean: automatically set the range of PSI values based on available data? If FALSE, the axis relative to PSI values will range from 0 to 1
loessSmooth	Boolean: plot a smooth curve computed by stats::loess.smooth?
loessFamily	Character: if gaussian, loess fitting is by least-squares, and if symmetric, a re-descending M estimator is used
colour	Character: points' colour
alpha	Numeric: points' alpha
size	Numeric: points' size
loessColour	Character: loess line's colour
loessAlpha	Numeric: loess line's opacity
loessWidth	Numeric: loess line's width
fontSize	Numeric: plot font size
...	Arguments passed on to stats::loess.smooth <b>span</b> smoothness parameter for loess. <b>degree</b> degree of local polynomial used. <b>evaluation</b> number of points at which to evaluate the smooth curve.
colourGroups	List of characters: sample colouring by group
legend	Boolean: show legend for sample colouring?
showAllData	Boolean: show data outside selected groups as a single group (coloured based on the colour argument)
density	Boolean: contour plot of a density estimate
densityColour	Character: line colour of contours
densityWidth	Numeric: line width of contours

**Value**

Renders plots for each correlation in corr

**Examples**

```

annot <- readfile("ex_splicing_annotation.RDS")
junctionQuant <- readfile("ex_junctionQuant.RDS")
psi <- quantifySplicing(annot, junctionQuant, eventType=c("SE", "MXE"))

geneExpr <- readfile("ex_gene_expression.RDS")
corr <- correlateGEandAS(geneExpr, psi, "ALDOA")

colourGroups <- list(Normal=paste("Normal", 1:3),
                    Tumour=paste("Cancer", 1:3))
attr(colourGroups, "Colour") <- c(Normal="#00C65A", Tumour="#EEE273")
plotCorrelation(corr, colourGroups=colourGroups, alpha=1)

```

---

plotDistribution      *Plot distribution through a density plot*

---

### Description

The tooltip shows the median, variance, max, min and number of non-NA samples of each data series.

### Usage

```
plotDistribution(data, groups = "All samples", rug = TRUE,
  vLine = TRUE, ..., title = NULL, psi = NULL)

plotDensity(data, groups = "All samples", rug = TRUE, vLine = TRUE,
  ..., title = NULL, psi = NULL)
```

### Arguments

data	Numeric, data frame or matrix: data for one gene or alternative splicing event
groups	List of characters (list of groups containing data identifiers) or character vector (group of each value in data)
rug	Boolean: include rug plot to better visualise data distribution
vLine	Boolean: include vertical plot lines to display descriptive statistics for each group
...	Extra parameters passed to <code>density</code> to create the kernel density estimates
title	Character: plot title
psi	Boolean: are data composed of PSI values? Automatically set to TRUE if all data values are between 0 and 1

### Value

Highcharter object with density plot

### Examples

```
data <- sample(20, rep=TRUE)/20
groups <- c(rep("A", 10), rep("B", 10))
plotDistribution(data, groups)
```

---

plotGroupIndependence *Plot -log10(p-values) of the results obtained after multiple group independence testing*

---

### Description

Plot  $-\log_{10}$ (p-values) of the results obtained after multiple group independence testing

### Usage

```
plotGroupIndependence(groups, top = 50, textSize = 10,
  colourLow = "lightgrey", colourMid = "blue", colourHigh = "orange",
  colourMidpoint = 150)
```

### Arguments

groups	multiGroupIndependenceTest object (obtained after running <a href="#">testGroupIndependence</a> )
top	Integer: number of attributes to render
textSize	Integer: size of the text
colourLow	Character: name or HEX code of colour for lower values
colourMid	Character: name or HEX code of colour for middle values
colourHigh	Character: name or HEX code of colour for higher values
colourMidpoint	Numeric: midpoint to identify middle values

### Value

ggplot object

### See Also

[parseCategoricalGroups](#) and [testGroupIndependence](#)

### Examples

```
elements <- paste("patients", 1:50)
ref      <- elements[10:50]
groups  <- list(race=list(asian=elements[1:3],
  white=elements[4:7],
  black=elements[8:10]),
  region=list(european=elements[c(4, 5, 9)],
  african=elements[c(6:8, 10:50)]))
groupTesting <- testGroupIndependence(ref, groups, elements)
plotGroupIndependence(groupTesting)
```

plotICA

*Create multiple scatterplots from ICA***Description**

Create multiple scatterplots from ICA

**Usage**

```
plotICA(ica, components = seq(10), groups = NULL, ...)
```

**Arguments**

<code>ica</code>	Object resulting from <a href="#">performICA</a>
<code>components</code>	Numeric: independent components to plot
<code>groups</code>	Matrix: groups to plot indicating the index of interest of the samples (use clinical or sample groups)
<code>...</code>	Arguments passed on to <code>pairsD3::pairsD3</code>

**group** a optional vector specifying the group each observation belongs to. Used for tooltips and colouring the observations.

**subset** an optional vector specifying a subset of observations to be used for plotting. Useful when you have a large number of observations, you can specify a random subset.

**labels** the names of the variables (column names of `x` used by default).

**cex** the magnification of the plotting symbol (default=3)

**width** the width (and height) of the plot when viewed externally.

**col** an optional (hex) colour for each of the levels in the group vector.

**big** a logical parameter. Prevents inadvertent plotting of huge data sets. Default limit is 10 variables, to plot more than 10 set `big=TRUE`.

**theme** a character parameter specifying whether the theme should be colour colour (default) or black and white bw.

**opacity** numeric between 0 and 1. The opacity of the plotting symbols (default 0.9).

**tooltip** an optional vector with the tool tip to be displayed when hovering over an observation. You can include basic html.

**leftmar** space on the left margin

**topmar** space on the bottom margin

**Value**

Multiple scatterplots as a `pairsD3` object

**Examples**

```
data <- scale(USArrests)
ica <- fastICA::fastICA(data, n.comp=4)
plotICA(ica)

# Colour by groups
```

```
groups <- NULL
groups$sunny <- c("California", "Hawaii", "Florida")
groups$ozEntrance <- c("Kansas")
groups$novel <- c("New Mexico", "New York", "New Hampshire", "New Jersey")
plotICA(ica, groups=groups)
```

---

plotPCA *Create a scatterplot from a PCA object*

---

### Description

Create a scatterplot from a PCA object

### Usage

```
plotPCA(pca, pcX = 1, pcY = 2, groups = NULL, individuals = TRUE,
        loadings = FALSE, nLoadings = NULL)
```

### Arguments

pca	prcomp object
pcX	Character: name of the X axis of interest from the PCA
pcY	Character: name of the Y axis of interest from the PCA
groups	Matrix: groups to plot indicating the index of interest of the samples (use clinical or sample groups)
individuals	Boolean: plot PCA individuals (TRUE by default)
loadings	Boolean: plot PCA loadings/rotations (FALSE by default)
nLoadings	Integer: Number of variables to plot, ordered by those that most contribute to selected principal components (this allows for faster performance as only the variables that most contribute are rendered); if NULL, all variables are plotted

### Value

Scatterplot as an highcharter object

### Examples

```
pca <- prcomp(USArrests, scale=TRUE)
plotPCA(pca)
plotPCA(pca, pcX=2, pcY=3)

# Plot both individuals and loadings
plotPCA(pca, pcX=2, pcY=3, loadings=TRUE)
```

---

plotPointsStyle      *Interface to modify the style of the plot points*

---

**Description**

Interface to modify the style of the plot points

**Usage**

```
plotPointsStyle(ns, id, description, help = NULL, size = 2,  
               colour = "black", alpha = 1)
```

**Arguments**

ns	Namespace function
id	Character: identifier
description	Character: display text for user
help	Character: extra text to help the user
size	Integer: default size (2 by default)
colour	Character: default colour ("black" by default)
alpha	Numeric: default transparency value; (opaque by default)

**Value**

HTML elements

---

plotProtein      *Plot protein features*

---

**Description**

Plot protein features

**Usage**

```
plotProtein(molecule)
```

**Arguments**

molecule	Character: UniProt protein or Ensembl transcript identifier
----------	-------------------------------------------------------------

**Value**

highcharter object



**Examples**

```
## Not run:
protein <- "P38398"
plotProtein(protein)

transcript <- "ENST00000488540"
plotProtein(transcript)

## End(Not run)
```

---

plotSingleICA	<i>Create a scatterplot for ICA</i>
---------------	-------------------------------------

---

**Description**

Create a scatterplot for ICA

**Usage**

```
plotSingleICA(ica, icX = 1, icY = 2, groups = NULL)
```

**Arguments**

ica	Object containing an ICA
icX	Character: name of the X axis
icY	Character: name of the Y axis
groups	Matrix: groups to plot indicating the index of interest of the samples (use clinical or sample groups)

**Value**

Scatterplot as an highcharter object

**Examples**

```
ica <- performICA(USArrests, scale=TRUE)
psychomics:::plotSingleICA(ica)
psychomics:::plotSingleICA(ica, icX=2, icY=3)

# Colour by groups
groups <- NULL
groups$sunny <- c("California", "Hawaii", "Florida")
groups$ozEntrance <- c("Kansas")
groups$novel <- c("New Mexico", "New York", "New Hampshire", "New Jersey")
psychomics:::plotSingleICA(ica, groups=groups)
```

---

plotSurvivalCurves     *Plot survival curves*

---

### Description

Plot survival curves

### Usage

```
plotSurvivalCurves(surv, mark = TRUE, interval = FALSE,
  pvalue = NULL, title = "Survival analysis", scale = NULL,
  auto = TRUE)
```

### Arguments

surv	Survival object
mark	Boolean: mark times? TRUE by default
interval	Boolean: show interval ranges? FALSE by default
pvalue	Numeric: p-value of the survival curves
title	Character: plot title
scale	Character: time scale; default is "days"
auto	Boolean: return the plot automatically prepared (TRUE) or only the bare minimum (FALSE)? TRUE by default

### Value

Plot of survival curves

### Examples

```
require("survival")
fit <- survfit(Surv(time, status) ~ x, data = aml)
plotSurvivalCurves(fit)
```

---

plottableXranges     *HTML code to plot a X-ranges series*

---

### Description

HTML code to plot a X-ranges series

### Usage

```
plottableXranges(hc, shiny = FALSE)
```

### Arguments

hc	highcharter object
shiny	Boolean: is the function running in a Shiny session? FALSE by default

**Value**

HTML elements

---

plotTranscripts	<i>Plot transcripts</i>
-----------------	-------------------------

---

**Description**

Plot transcripts

**Usage**

```
plotTranscripts(info, eventPosition = NULL, event = NULL,
  shiny = FALSE)
```

**Arguments**

info	Information retrieved from Ensembl
eventPosition	Numeric: coordinates of the alternative splicing event (ignored if event is set)
event	Character: identifier of the alternative splicing event to plot
shiny	Boolean: is the function running in a Shiny session? FALSE by default

**Value**

NULL (this function is used to modify the Shiny session's state)

**Examples**

```
event <- "SE_12_-_7985318_7984360_7984200_7982602_SLC2A14"
info <- queryEnsemblByEvent(event, species="human", assembly="hg19")
## Not run:
plotTranscripts(info, event=event)

## End(Not run)
```

---

plotVariance	<i>Create the explained variance plot</i>
--------------	-------------------------------------------

---

**Description**

Create the explained variance plot

**Usage**

```
plotVariance(pca)
```

**Arguments**

pca	PCA values
-----	------------

**Value**

Plot variance as an Highcharter object

**Examples**

```
pca <- prcomp(USArrests)
plotVariance(pca)
```

---

```
prepareAnnotationFromEvents
```

*Prepare annotation from alternative splicing events*

---

**Description**

In case more than one data frame with alternative splicing events is given, the events are cross-referenced according to the chromosome, strand and relevant coordinates per event type (see details).

**Usage**

```
prepareAnnotationFromEvents(...)
```

**Arguments**

... Data frame(s) of alternative splicing events to include in the annotation

**Details**

Events from two or more data frames are cross-referenced based on each event's chromosome, strand and specific coordinates relevant for each event type:

- Skipped exon: constitutive exon 1 end, alternative exon (start and end) and constitutive exon 2 start
- Mutually exclusive exon: constitutive exon 1 end, alternative exon 1 and 2 (start and end) and constitutive exon 2 start
- Alternative 5' splice site: constitutive exon 1 end, alternative exon 1 end and constitutive exon 2 start
- Alternative first exon: same as alternative 5' splice site
- Alternative 3' splice site: constitutive exon 1 end, alternative exon 1 start and constitutive exon 2 start
- Alternative last exon: same as alternative 3' splice site

**Value**

List of data frames with the annotation from different data frames joined by event type

**Note**

When cross-referencing events, gene information is discarded.

**Examples**

```
# Load sample files (SUPPA annotation)
folder <- "extdata/eventsAnnotSample/suppa_output/suppaEvents"
suppaOutput <- system.file(folder, package="psychomics")

# Parse and prepare SUPPA annotation
suppa <- parseSuppaAnnotation(suppaOutput)
annot <- prepareAnnotationFromEvents(suppa)

# Load sample files (rMATS annotation)
folder <- "extdata/eventsAnnotSample/mats_output/ASEvents/"
matsOutput <- system.file(folder, package="psychomics")

# Parse rMATS annotation and prepare combined annotation from rMATS and SUPPA
mats <- parseMatsAnnotation(matsOutput)
annot <- prepareAnnotationFromEvents(suppa, mats)
```

---

prepareEventPlotOptions

*Prepare event plot options*

---

**Description**

Prepare event plot options

**Usage**

```
prepareEventPlotOptions(id, ns, labelsPanel = NULL)
```

**Arguments**

id	Character: identifier
ns	Namespace identifier
labelsPanel	Tab panel containing options to label points

**Value**

HTML elements

---

prepareFileBrowser

*Prepare file browser dialogue and update the input's value accordingly to selected file or directory*

---

**Description**

Prepare file browser dialogue and update the input's value accordingly to selected file or directory

**Usage**

```
prepareFileBrowser(session, input, id, modalId = "modal", ...)
```

**Arguments**

session	Shiny session
input	Shiny input
id	Character: input identifier
modalId	Character: modal window identifier
...	Arguments passed on to fileBrowser
<b>default</b>	Character: path to initial folder
<b>caption</b>	Character: caption on the selection dialogue
<b>multiple</b>	Boolean: allow to select multiple files?
<b>directory</b>	Boolean: allow to select directories instead of files?

**Value**

NULL (this function is used to modify the Shiny session's state)

---

```
prepareFirebrowseArchives
```

*Prepares Firebrowse archives in a given directory*

---

**Description**

Checks Firebrowse archives' integrity using the MD5 files, extracts the content of the archives, moves the content to newly-created folders and removes the original downloaded archives.

**Usage**

```
prepareFirebrowseArchives(archive, md5, folder, outdir)
```

```
prepareFirehoseArchives(archive, md5, folder, outdir)
```

```
prepareTCGAarchives(archive, md5, folder, outdir)
```

**Arguments**

archive	Character: path to downloaded archives
md5	Character: path to MD5 files of each archive
folder	Character: master directory where every archive will be extracted
outdir	Character: subdirectories where to move the extracted content

**Value**

Invisible TRUE if successful

**Examples**

```

file <- paste0(
  "~/Downloads",
  "ACC/20151101/gdac.broadinstitute.org_ACC.",
  "Merge_Clinical.Level_1.2015110100.0.0.tar.gz")
md5 <- paste0(file, ".md5")
## Not run:
prepareFirebrowseArchives(archive = file, md5 = paste0(file, ".md5"))

## End(Not run)

```

---

```
prepareSRAMetadata    Prepare files to be loaded into psichomics
```

---

**Description**

Prepare files to be loaded into psichomics

**Usage**

```

prepareSRAMetadata(file, output = "psichomics_metadata.txt")

prepareJunctionQuant(..., output = "psichomics_junctions.txt",
  startOffset = NULL, endOffset = NULL)

prepareJunctionQuantSTAR(..., startOffset = -1, endOffset = +1)

prepareGeneQuant(..., output = "psichomics_gene_counts.txt",
  strandedness = c("unstranded", "stranded", "stranded (reverse)"))

prepareGeneQuantSTAR(..., strandedness = c("unstranded", "stranded",
  "stranded (reverse)"))

```

**Arguments**

file	Character: path to file
output	Character: path of output file (if NULL, only returns the data without saving it to a file)
...	Character: path to file(s) to read
startOffset	Numeric: value to offset start position
endOffset	Numeric: value to offset end position
strandedness	Character: strandedness of RNA-seq protocol; may be one of the following: unstranded, stranded or stranded (reverse)

**Value**

Prepared file

**Examples**

```

## Not run:
prepareJunctionQuant("Control rep1"=junctionFile1,
                    "Control rep2"=junctionFile2,
                    "KD rep1"=junctionFile3,
                    "KD rep2"=junctionFile4)

## End(Not run)
## Not run:
prepareGeneQuant("Control rep1"=geneCountFile1,
                "Control rep2"=geneCountFile2,
                "KD rep1"=geneCountFile3,
                "KD rep2"=geneCountFile4)

## End(Not run)

```

---

prepareWordBreak	<i>Create word break opportunities (for HTML) using given characters</i>
------------------	--------------------------------------------------------------------------

---

**Description**

Create word break opportunities (for HTML) using given characters

**Usage**

```
prepareWordBreak(str, pattern = c(".", "-", "\\\"", "/", "_"))
```

**Arguments**

str	Character: text
pattern	Character: pattern(s) of interest to be used as word break opportunities

**Value**

String containing HTML elements

---

processButton	<i>Style button used to initiate a process</i>
---------------	------------------------------------------------

---

**Description**

Style button used to initiate a process

**Usage**

```
processButton(id, label, ..., class = "btn-primary")
```



**Arguments**

id	Character: button identifier
label	Character: label
...	Arguments passed on to shiny::actionButton
	<b>icon</b> An optional <a href="#">icon</a> to appear on the button.
	<b>width</b> The width of the input, e.g. '400px', or '100%'; see <a href="#">validateCssUnit</a> .
class	Character: class

**Value**

HTML for a button

---

processDatasetNames    *Process dataset names*

---

**Description**

Process dataset names

**Usage**

```
processDatasetNames(data)
```

**Arguments**

data	List of lists of data frames
------	------------------------------

**Details**

Avoid duplicated names and append the technology used for junction quantification

**Value**

Processed list of lists of data frames

---

processSurvData    *Process survival data to calculate survival curves*

---

**Description**

Process survival data to calculate survival curves

**Usage**

```
processSurvData(event, timeStart, timeStop, followup, group, clinical,
  survTime = NULL)
```

**Arguments**

event	Character: name of column containing time of the event of interest
timeStart	Character: name of column containing starting time of the interval or follow up time
timeStop	Character: name of column containing ending time of the interval (only relevant for interval censoring)
followup	Character: name of column containing follow up time
group	Character: group relative to each patient
clinical	Data frame: clinical data
survTime	survTime object: Times to follow up, time start, time stop and event (optional)

**Details**

The event time will only be used to determine whether the event has occurred (1) or not (0) in case of missing values.

If survTime is NULL, the survival times will be fetch from the clinical dataset according to the names given in timeStart, timeStop, event and followup. This can became quite slow when using the function in a for loop. If these variables are constant, consider running the function [getAttributesTime](#) to retrieve the time of such columns once and hand the result to the survTime argument of this function.

**Value**

Data frame with terms needed to calculate survival curves

---

processSurvival	<i>Check if survival analyses successfully completed or returned errors</i>
-----------------	-----------------------------------------------------------------------------

---

**Description**

Check if survival analyses successfully completed or returned errors

**Usage**

```
processSurvival(session, ...)
```

**Arguments**

session	Shiny session
...	Arguments passed on to processSurvTerms
<b>censoring</b>	Character: censor using "left", "right", "interval" or "interval2"
<b>scale</b>	Character: rescale the survival time to "days", "weeks", "months" or "years"
<b>formulaStr</b>	Character: formula to use
<b>coxph</b>	Boolean: fit a Cox proportional hazards regression model? FALSE by default
<b>survTime</b>	survTime object: times to follow up, time start, time stop and event (optional)

**clinical** Data frame: clinical data  
**event** Character: name of column containing time of the event of interest  
**timeStart** Character: name of column containing starting time of the interval or follow up time  
**timeStop** Character: name of column containing ending time of the interval (only relevant for interval censoring)  
**group** Character: group relative to each patient  
**followup** Character: name of column containing follow up time

### Value

List with survival analysis results

---

processSurvTerms	<i>Process survival curves terms to calculate survival curves</i>
------------------	-------------------------------------------------------------------

---

### Description

Process survival curves terms to calculate survival curves

### Usage

```
processSurvTerms(clinical, censoring, event, timeStart, timeStop = NULL,
  group = NULL, formulaStr = NULL, coxph = FALSE, scale = "days",
  followup = "days_to_last_followup", survTime = NULL)
```

### Arguments

clinical	Data frame: clinical data
censoring	Character: censor using "left", "right", "interval" or "interval2"
event	Character: name of column containing time of the event of interest
timeStart	Character: name of column containing starting time of the interval or follow up time
timeStop	Character: name of column containing ending time of the interval (only relevant for interval censoring)
group	Character: group relative to each patient
formulaStr	Character: formula to use
coxph	Boolean: fit a Cox proportional hazards regression model? FALSE by default
scale	Character: rescale the survival time to "days", "weeks", "months" or "years"
followup	Character: name of column containing follow up time
survTime	survTime object: times to follow up, time start, time stop and event (optional)

### Details

If `survTime` is `NULL`, the survival times will be fetch from the clinical dataset according to the names given in `timeStart`, `timeStop`, `event` and `followup`. This can became quite slow when using the function in a for loop. If these variables are constant, consider running the function [getAttributeTime](#) to retrieve the time of such columns once and hand the result to the `survTime` argument of this function.

**Value**

A list with a formula object and a data frame with terms needed to calculate survival curves

**Examples**

```
clinical <- read.table(text = "2549  NA ii  female
                             840  NA  i   female
                             NA 1204 iv   male
                             NA  383 iv   female
                             1293 NA iii  male
                             NA 1355 ii   male")
names(clinical) <- c("patient.days_to_last_followup",
                    "patient.days_to_death",
                    "patient.stage_event.pathologic_stage",
                    "patient.gender")
timeStart <- "days_to_death"
event <- "days_to_death"
formulaStr <- "patient.stage_event.pathologic_stage + patient.gender"
survTerms <- processSurvTerms(clinical, censoring="right", event, timeStart,
                              formulaStr=formulaStr)
```

---

 psychomics

*Start graphical interface of psychomics*


---

**Description**

Start graphical interface of psychomics

**Usage**

```
psychomics(..., reset = FALSE, testData = FALSE)
```

**Arguments**

... Arguments passed on to `shiny::runApp`

**port** The TCP port that the application should listen on. If the port is not specified, and the `shiny.port` option is set (with `options(shiny.port = XX)`), then that port will be used. Otherwise, use a random port.

**host** The IPv4 address that the application should listen on. Defaults to the `shiny.host` option, if set, or `"127.0.0.1"` if not. See Details.

**workerId** Can generally be ignored. Exists to help some editions of Shiny Server Pro route requests to the correct process.

**quiet** Should Shiny status messages be shown? Defaults to `FALSE`.

**display.mode** The mode in which to display the application. If set to the value `"showcase"`, shows application code and metadata from a `DESCRIPTION` file in the application directory alongside the application. If set to `"normal"`, displays the application normally. Defaults to `"auto"`, which displays the application in the mode given in its `DESCRIPTION` file, if any.

**test.mode** Should the application be launched in test mode? This is only used for recording or running automated tests. Defaults to the `shiny.testmode` option, or `FALSE` if the option is not set.

**reset** Boolean: reset Shiny session? requires the package `devtools` to reset data

**testData** Boolean: auto-start with test data

**Value**

NULL (this function is used to modify the Shiny session's state)

**Examples**

```
## Not run:
psychomics()

## End(Not run)
```

---

pubmedUI	<i>Return the interface of relevant PubMed articles for a given gene</i>
----------	--------------------------------------------------------------------------

---

**Description**

Return the interface of relevant PubMed articles for a given gene

**Usage**

```
pubmedUI(gene, ...)
```

**Arguments**

gene	Character: gene
...	Arguments passed on to queryPubMed
<b>top</b>	Numeric: number of articles to retrieve (3 by default)
<b>field</b>	Character: field of interest where to look for terms ("abstract" by default)
<b>sort</b>	Character: sort by a given parameter ("relevance" by default)

**Value**

HTML interface of relevant PubMed articles

---

quantifySplicing	<i>Quantify alternative splicing events</i>
------------------	---------------------------------------------

---

**Description**

Quantify alternative splicing events

**Usage**

```
quantifySplicing(annotation, junctionQuant, eventType = c("SE", "MXE",
  "ALE", "AFE", "A3SS", "A5SS"), minReads = 10, genes = NULL)
```

**Arguments**

annotation	List of data frames: annotation for each alternative splicing event type
junctionQuant	Data frame: junction quantification
eventType	Character: splicing event types to quantify
minReads	Integer: discard alternative splicing quantified using a number of reads below this threshold
genes	Character: gene symbols for which the splicing quantification of associated splicing events is performed (by default, all splicing events undergo splicing quantification)

**Value**

Data frame with the quantification of the alternative splicing events

**Examples**

```
# Calculate PSI for skipped exon (SE) and mutually exclusive (MXE) events
annot <- readRDS("ex_splicing_annotation.RDS")
junctionQuant <- readRDS("ex_junctionQuant.RDS")

psi <- quantifySplicing(annot, junctionQuant, eventType=c("SE", "MXE"))
```

---

quantifySplicingSet    *Set of functions to quantify alternative splicing*

---

**Description**

Instructions to build the Shiny app

**Usage**

```
quantifySplicingSet(session, input)
```

**Arguments**

session	Session object
input	Input object

**Value**

NULL (this function is used to modify the Shiny session's state)

---

queryEnsembl      *Query the Ensembl REST API*

---

**Description**

Query the Ensembl REST API

**Usage**

```
queryEnsembl(path, query, grch37 = TRUE)
```

**Arguments**

path	Character: API path
query	Character: API query
grch37	Boolean: query the Ensembl GRCh37 API? TRUE by default; otherwise, query the most recent API

**Value**

Parsed response or NULL if there's no response

**Examples**

```
path <- "overlap/region/human/7:140424943-140624564"
query <- list(feature = "gene")
psychomics:::queryEnsembl(path, query, grch37 = TRUE)

path <- "lookup/symbol/human/BRCA2"
query <- list(expand=1)
psychomics:::queryEnsembl(path, query, grch37 = TRUE)
```

---

queryEnsemblByEvent      *Query information from Ensembl by a given alternative splicing event*

---

**Description**

Query information from Ensembl by a given alternative splicing event

**Usage**

```
queryEnsemblByEvent(event, ...)
```

**Arguments**

event	Character: alternative splicing event identifier
...	Arguments passed on to queryEnsemblByGene
<b>species</b>	Character: species (can be NULL when handling an Ensembl identifier)
<b>assembly</b>	Character: assembly version (can be NULL when handling an Ensembl identifier)

**Value**

Information from Ensembl

**Examples**

```
event <- c("SE_17_-_41251792_41249306_41249261_41246877_BRCA1")
queryEnsemblByEvent(event, species="human", assembly="hg19")
```

---

queryEnsemblByGene      *Query information from Ensembl by a given gene*

---

**Description**

Query information from Ensembl by a given gene

**Usage**

```
queryEnsemblByGene(gene, species = NULL, assembly = NULL)
```

**Arguments**

gene	Character: gene identifier
species	Character: species (can be NULL when handling an Ensembl identifier)
assembly	Character: assembly version (can be NULL when handling an Ensembl identifier)

**Value**

Information from Ensembl

**Examples**

```
queryEnsemblByGene("BRCA1", "human", "hg19")
queryEnsemblByGene("ENSG00000139618")
```

---

queryFirebrowseData      *Query the Firebrowse web API for TCGA data*

---

**Description**

Query the Firebrowse web API for TCGA data

**Usage**

```
queryFirebrowseData(format = "json", date = NULL, cohort = NULL,
  data_type = NULL, tool = NULL, platform = NULL, center = NULL,
  level = NULL, protocol = NULL, page = NULL, page_size = NULL,
  sort_by = NULL)
```

```
queryFirehoseData(format = "json", date = NULL, cohort = NULL,
  data_type = NULL, tool = NULL, platform = NULL, center = NULL,
  level = NULL, protocol = NULL, page = NULL, page_size = NULL,
  sort_by = NULL)
```



**Arguments**

format	Character: response format as JSON (default), CSV or TSV
date	Character: dates of the data retrieval by Firebrowse (by default, it uses the most recent data available)
cohort	Character: abbreviation of the cohorts (by default, returns data for all cohorts)
data_type	Character: data types (optional)
tool	Character: data produced by the selected Firebrowse tools (optional)
platform	Character: data generation platforms (optional)
center	Character: data generation centres (optional)
level	Integer: data levels (optional)
protocol	Character: sample characterization protocols (optional)
page	Integer: page of the results to return (optional)
page_size	Integer: number of records per page of results; max is 2000 (optional)
sort_by	String: column used to sort the data (by default, it sorts by cohort)

**Value**

Response from the Firebrowse web API (it needs to be parsed)

**Examples**

```
cohort <- psychomics::getFirebrowseCohorts()[1]
psychomics::queryFirebrowseData(cohort = cohort, data_type = "mRNASeq")

# Querying for data from a specific date
dates <- psychomics::getFirebrowseDates()
dates <- format(dates, psychomics::getFirebrowseDateFormat())$query

psychomics::queryFirebrowseData(date = dates[2], cohort = cohort)
```

---

queryPubMed

*Query the PubMed REST API*


---

**Description**

Query the PubMed REST API

**Usage**

```
queryPubMed(primary, ..., top = 3, field = "abstract",
             sort = "relevance")
```

**Arguments**

primary	Character: primary search term
...	Character: other relevant search terms
top	Numeric: number of articles to retrieve (3 by default)
field	Character: field of interest where to look for terms ("abstract" by default)
sort	Character: sort by a given parameter ("relevance" by default)

**Value**

Parsed response

**Examples**

```
psychomics:::queryPubMed("BRCA1", "cancer", "adrenocortical carcinoma")
```

---

queryUniprot

*Query the UniProt REST API*

---

**Description**

Query the UniProt REST API

**Usage**

```
queryUniprot(molecule, format = "xml")
```

**Arguments**

molecule	Character: protein or transcript to query
format	Character: format of the response

**Value**

Parsed response

**Examples**

```
protein <- "P51587"
format <- "xml"
psychomics:::queryUniprot(protein, format)

transcript <- "ENST00000488540"
format <- "xml"
psychomics:::queryUniprot(transcript, format)
```

---

readAnnot

*Read custom or remote annotation*

---

**Description**

Instructions to build the Shiny app

**Usage**

```
readAnnot(session, annotation, showProgress = FALSE)
```

**Arguments**

session            Session object  
 annotation        Character: chosen annotation  
 showProgress      Boolean: show progress? FALSE by default

**Value**

NULL (this function is used to modify the Shiny session's state)

---

readFile	<i>Load local file</i>
----------	------------------------

---

**Description**

Load local file

**Usage**

```
readFile(file)
```

**Arguments**

file                Character: path to the file

**Value**

Loaded file

**Examples**

```
junctionQuant <- readFile("ex_junctionQuant.RDS")
```

---

reduceDimensionality	<i>Reduce dimensionality after processing missing values from data frame</i>
----------------------	------------------------------------------------------------------------------

---

**Description**

Reduce dimensionality after processing missing values from data frame

**Usage**

```
reduceDimensionality(data, type = c("pca", "ica"), center = TRUE,
  scale. = FALSE, naTolerance = NULL, missingValues = round(0.05 *
  ncol(data)), ...)
```



---

renameGroups	<i>Rename duplicated names from a new group</i>
--------------	-------------------------------------------------

---

**Description**

Rename duplicated names from a new group

**Usage**

```
renameGroups(new, old)
```

**Arguments**

new	Matrix: new groups
old	Matrix: pre-existing groups

**Value**

Character with no duplicated group names

**Note**

The names of pre-existing groups are not modified.

---

renderDataTableSparklines	<i>Render a data table with sparkline HTML elements</i>
---------------------------	---------------------------------------------------------

---

**Description**

Render a data table with sparkline HTML elements

**Usage**

```
renderDataTableSparklines(..., options = NULL)
```

**Arguments**

...	Arguments passed on to <code>shiny::renderDataTable</code>
<b>expr</b>	An expression that returns a data frame or a matrix.
<b>searchDelay</b>	The delay for searching, in milliseconds (to avoid too frequent search requests).
<b>callback</b>	A JavaScript function to be applied to the DataTable object. This is useful for DataTables plug-ins, which often require the DataTable instance to be available ( <a href="http://datatables.net/extensions/">http://datatables.net/extensions/</a> ).
<b>quoted</b>	Is <code>expr</code> a quoted expression (with <code>quote()</code> )? This is useful if you want to save an expression in a variable.
<b>outputArgs</b>	A list of arguments to be passed through to the implicit call to <code>dataTableOutput</code> when <code>renderDataTable</code> is used in an interactive R Markdown document.
options	List of options to pass to <code>renderDataTable</code>

**Details**

This slightly modified version of [renderDataTable](#) calls a JavaScript function to convert the sparkline HTML elements to interactive Highcharts

**Value**

NULL (this function is used to modify the Shiny session's state)

---

renderGeneticInfo	<i>Render genetic information</i>
-------------------	-----------------------------------

---

**Description**

Render genetic information

**Usage**

```
renderGeneticInfo(output, ns, info, species = NULL, assembly = NULL,
  grch37 = FALSE)
```

**Arguments**

output	Shiny output
ns	Namespace function
info	Information as retrieved from Ensembl
species	Character: species name (NULL by default)
assembly	Character: assembly version (NULL by default)
grch37	Boolean: use version GRCh37 of the genome? FALSE by default

**Value**

HTML elements to render gene, protein and transcript annotation

---

renderGroupInterface	<i>Render group interface</i>
----------------------	-------------------------------

---

**Description**

Render group interface

**Usage**

```
renderGroupInterface(ns, multiFisherTests = TRUE)
```

**Arguments**

ns	Namespace function
multiFisherTests	Boolean: allow to perform multiple Fisher exact test between groups

**Value**

HTML elements

---

renderProteinInfo	<i>Render protein information</i>
-------------------	-----------------------------------

---

**Description**

Render protein information

**Usage**

renderProteinInfo(protein, transcript, species, assembly)

**Arguments**

protein	Character: protein identifier
transcript	Character: Ensembl identifier of the protein's respective transcript
species	Character: species
assembly	Character: assembly

**Value**

HTML elements

---

rm.null	<i>Filter NULL elements from vector or list</i>
---------	-------------------------------------------------

---

**Description**

Filter NULL elements from vector or list

**Usage**

rm.null(v)

**Arguments**

v	Vector or list
---	----------------

**Value**

Filtered vector or list with no NULL elements; if the input is a vector composed of only NULL elements, it returns a NULL (note that it will return an empty list if the input is a list with only NULL elements)

---

roundDigits	<i>Round by the given number of digits</i>
-------------	--------------------------------------------

---

**Description**

Round by the given number of digits

**Usage**

```
roundDigits(n)
```

**Arguments**

n	Numeric: number to round
---	--------------------------

**Value**

Formatted number with a given numeric precision

---

roundMinDown	<i>Round down/up the minimum/maximum value</i>
--------------	------------------------------------------------

---

**Description**

Round down/up the minimum/maximum value

**Usage**

```
roundMinDown(x, digits = 0)
```

```
roundMaxUp(x, digits = 0)
```

**Arguments**

x	Numeric: values
digits	Numeric: number of maximum digits

**Value**

Rounded numeric value



---

rowMeans	<i>Calculate mean for each row of a matrix</i>
----------	------------------------------------------------

---

**Description**

Calculate mean for each row of a matrix

**Usage**

```
rowMeans(mat, na.rm = FALSE)
```

**Arguments**

mat	Matrix
na.rm	Boolean: remove NAs?

**Value**

Vector of means

**Examples**

```
df <- rbind("Gene 1"=c(3, 5, 7), "Gene 2"=c(8, 2, 4), "Gene 3"=c(9:11))  
rowMeans(df)
```

---

rowVars	<i>Calculate variance for each row of a matrix</i>
---------	----------------------------------------------------

---

**Description**

Calculate variance for each row of a matrix

**Usage**

```
rowVars(mat, na.rm = FALSE)
```

**Arguments**

mat	Matrix
na.rm	Boolean: remove NAs?

**Value**

Vector of variances

**Examples**

```
df <- rbind("Gene 1"=c(3, 5, 7), "Gene 2"=c(8, 2, 4), "Gene 3"=c(9:11))  
rowVars(df)
```

---

selectGroupsUI	<i>Group selection</i>
----------------	------------------------

---

**Description**

Group selection interface and logic

**Usage**

```
selectGroupsUI(id, label,
  placeholder = "Click 'Groups' to create or edit groups",
  noGroupsLabel = NULL, groupsLabel = NULL, maxItems = NULL,
  returnAllDataLabel = NULL, returnAllDataValue = FALSE)

selectGroupsServer(session, id, type, preference = NULL)

getSelectedGroups(input, id, type, filter = NULL)
```

**Arguments**

id	Character: identifier
label	Character: selectize label
placeholder	Character: selectize placeholder
noGroupsLabel	Character: label to explicitly allow to select no groups (if NULL, this option is not displayed to the user)
groupsLabel	Character: label to explicitly allow to select groups (only required if the noGroupsLabel argument is not NULL)
maxItems	Numeric: maximum number of groups to select
returnAllDataLabel	Character: label to allow to return data outside selected groups as belonging to an outside group (if NULL, this option is not displayed to the user)
returnAllDataValue	Boolean: default value to whether return all data or not (only required if the returnAllDataLabel argument is not NULL)
session	Shiny session
type	Character: type of groups (either "Patients", "Samples", "ASevents" or "Genes")
preference	Character: name of groups to pre-select, when available (if NULL, all groups will be pre-selected)
input	Shiny input
filter	Character: get groups only if they are present in this argument (if TCGA-styled gene symbols, they will be "converted" to gene symbols alone)

**Value**

selectGroupsUI: Interface for group selection  
 selectGroupsServer: Server logic for group selection  
 getSelectedGroups: List with selected groups (or NULL if no groups were selected)

**Note**

To allow the user to (explicitly) select no groups, pass the noGroupsLabel and groupsLabel arguments.

---

selectizeGeneInput      *Create input to select a gene*

---

**Description**

Create input to select a gene

**Usage**

```
selectizeGeneInput(id, label = "Gene", choices = NULL,
  multiple = FALSE)
```

**Arguments**

id	Character: identifier
label	Display label for the control, or NULL for no label.
choices	List of values to select from. If elements of the list are named, then that name rather than the value is displayed to the user. This can also be a named list whose elements are (either named or unnamed) lists or vectors. If this is the case, the outermost names will be used as the "optgroup" label for the elements in the respective sublist. This allows you to group and label similar choices. See the example section for a small demo of this feature.
multiple	Is selection of multiple items allowed?

**Value**

HTML elements

---

setASevent      *Get or set globally accessible elements*

---

**Description**

Get or set globally accessible elements

**Usage**

```
setASevent(event)
getEvent()
setEvent(event)
getCategories()
getCategory()
setCategory(category)
getCategoryData()
getActiveDataset()
setActiveDataset(dataset)
getClinicalData(attrs = NULL)
getPatientId()
getPatientAttributes()
getSampleInfo()
setSampleInfo(value, category = getCategory())
getSampleId()
getSampleAttributes()
getJunctionQuantification(category = getCategory())
getGeneExpression(category = getCategory())
setNormalisedGeneExpression(geneExpr, category = getCategory())
getInclusionLevels()
setInclusionLevels(incLevels, category = getCategory())
getPCA(category = getCategory())
setPCA(pca, category = getCategory())
getICA(category = getCategory())
setICA(ica, category = getCategory())
getCorrelation(category = getCategory())
```

```

setCorrelation(correlation, category = getCategory())
getGroupIndependenceTesting(category = getCategory())
setGroupIndependenceTesting(groupIndependenceTesting,
  category = getCategory())
getSpecies(category = getCategory())
setSpecies(species, category = getCategory())
getAssemblyVersion(category = getCategory())
setAssemblyVersion(assembly, category = getCategory())
getAnnotationName(category = getCategory())
setAnnotationName(annotName, category = getCategory())
getURLtoDownload()
setURLtoDownload(url)

```

### Arguments

event	Character: alternative splicing event
category	Character: data category (e.g. "Carcinoma 2016"); by default, it uses the selected data category
dataset	Character: dataset name
attrs	Character: name of attributes to retrieve (if NULL, the whole dataset is returned)
value	Value to attribute to an element
geneExpr	Data frame or matrix: normalised gene expression
incLevels	Data frame or matrix: inclusion levels
pca	prcomp object (principal component analysis)
ica	Object containing independent component analysis
correlation	prcomp object (correlation analyses)
groupIndependenceTesting	Object containing group independence testing results
species	Character: species
assembly	Character: assembly version
annotName	Character: annotation name
url	Character: URL links to download

### Value

Getters return globally accessible data, whereas setters return NULL as they are only used to modify the Shiny session's state

**See Also**

[getEvent](#), [getClinicalMatchFrom](#), [getGroups](#) and [getDifferentialSplicing](#)

---

setFirebrowseData      *Set data from Firebrowse*

---

**Description**

Set data from Firebrowse

**Usage**

```
setFirebrowseData(input, output, session, replace = TRUE)
```

**Arguments**

input	Shiny input
output	Shiny output
session	Shiny session
replace	Boolean: replace loaded data? TRUE by default

**Value**

NULL (this function is used to modify the Shiny session's state)

---

setLocalData      *Load local files*

---

**Description**

Load local files

**Usage**

```
setLocalData(input, output, session, replace = TRUE)
```

```
setMultipleFilesData(input, output, session, replace = TRUE)
```

**Arguments**

input	Shiny input
output	Shiny output
session	Shiny session
replace	Boolean: replace loaded data? TRUE by default

**Value**

NULL (this function is used to modify the Shiny session's state)

---

setOperation	<i>Perform set operations on selected groups</i>
--------------	--------------------------------------------------

---

**Description**

Perform set operations on selected groups

**Usage**

```
setOperation(operation, groups, selected, symbol = " ",
             groupName = NULL, first = NULL, second = NULL, matches = NULL,
             type = "Samples", assignColoursToGroups = FALSE)
```

**Arguments**

operation	Character: set operation
groups	Matrix: groups
selected	Integer: index of rows regarding selected groups
symbol	Character: Unicode symbol to visually indicate the operation performed (" " by default)
groupName	Character: group name (automatically created if NULL or "")
first	Character: identifiers of the first element (required when performing the complement operation)
second	Character: identifiers of the second element (required when performing the complement operation)
matches	Character: match between samples (as names) and patients (as values)
type	Character: type of group where set operations are to be performed
assignColoursToGroups	Boolean: assign colours to new groups? FALSE by default

**Value**

Matrix containing groups (new group is in the first row)

---

setOperationIcon	<i>Create an icon based on set operations</i>
------------------	-----------------------------------------------

---

**Description**

Based on the [icon](#) function

**Usage**

```
setOperationIcon(name, class = NULL, ...)
```

**Arguments**

name	Character: icon name
class	Character: additional classes to customise the icon element
...	Extra arguments for the icon HTML element

**Value**

Icon element

---

showAlert	<i>Show or remove an alert</i>
-----------	--------------------------------

---

**Description**

You can also use `errorAlert` and `warningAlert` to use template alerts already styled to show errors and warnings respectively.

**Usage**

```
showAlert(session, ..., title = NULL, style = NULL,
  dismissible = TRUE, alertId = "alert")
```

```
errorAlert(session, ..., title = NULL, dismissible = TRUE,
  alertId = "alert")
```

```
warningAlert(session, ..., title = NULL, dismissible = TRUE,
  alertId = "alert")
```

```
removeAlert(output, alertId = "alert")
```

**Arguments**

session	Shiny session
...	Arguments to render as elements of alert
title	Character: title of the alert (optional)
style	Character: style of the alert ("alert-danger", "alert-warning" or NULL)
dismissible	Boolean: is the alert dismissible? TRUE by default
alertId	Character: alert identifier
output	Shiny output

**Value**

NULL (this function is used to modify the Shiny session's state)

**See Also**

[showModal](#)



---

showGroupsTable	<i>Present groups table</i>
-----------------	-----------------------------

---

**Description**

Present groups table

**Usage**

```
showGroupsTable(type)
```

**Arguments**

type                   Character: type of groups (either "Patients", "Samples", "ASevents" or "Genes")

**Value**

Matrix with groups ordered (or NULL if no groups exist)

---

sidebar	<i>Sidebar without a well</i>
---------	-------------------------------

---

**Description**

Modified version of shiny::sidebarPanel without a well

**Usage**

```
sidebar(..., width = 4)
```

**Arguments**

...                    UI elements to include on the sidebar

width                  The width of the sidebar. For fluid layouts this is out of 12 total units; for fixed layouts it is out of whatever the width of the sidebar's parent column is.

**Value**

A sidebar that can be passed to [sidebarLayout](#)

**Examples**

```
# Sidebar with controls to select a dataset and specify
# the number of observations to view
sidebarPanel(
  selectInput("dataset", "Choose a dataset:",
             choices = c("rock", "pressure", "cars")),

  numericInput("obs", "Observations:", 10)
)
```

---

signifDigits	<i>Get number of significant digits</i>
--------------	-----------------------------------------

---

**Description**

Get number of significant digits

**Usage**

```
signifDigits(n)
```

**Arguments**

n	Numeric: number to round
---	--------------------------

**Value**

Formatted number with a given number of significant digits

---

singleDiffAnalyses	<i>Perform statistical analysis on a given splicing event</i>
--------------------	---------------------------------------------------------------

---

**Description**

Perform statistical analyses on a given vector containing elements from different groups

**Usage**

```
singleDiffAnalyses(vector, group, threshold = 1, step = 100,  
  analyses = c("wilcoxRankSum", "ttest", "kruskal", "levene", "fligner"))
```

**Arguments**

vector	Numeric
group	Character: group of each element in the vector
threshold	Integer: minimum number of data points to perform analysis in a group (default is 1)
step	Numeric: number of events before the progress bar is updated (a bigger number allows for a faster execution)
analyses	Character: analyses to perform (see "Details")

**Details**

The following statistical analyses may be performed by including the respective string in the analysis argument:

- ttest - Unpaired t-test (2 groups)
- wilcoxRankSum - Wilcoxon Rank Sum test (2 groups)
- kruskal - Kruskal test (2 or more groups)
- levene - Levene's test (2 or more groups)
- fligner - Fligner-Killeen test (2 or more groups)

**Value**

A row from a data frame with the results

---

sortCoordinates	<i>Sort coordinates for some event types</i>
-----------------	----------------------------------------------

---

**Description**

Some programs sort the coordinates of specific event types differently. To make them all comparable across programs, the coordinates are ordered by increasing (plus strand) or decreasing order (minus strand)

**Usage**

```
sortCoordinates(events)
```

**Arguments**

events	List of data frames with alternative splicing events for a given program
--------	--------------------------------------------------------------------------

**Value**

List of data frames with alternative splicing events for a given program

---

spearman	<i>Perform Spearman's test and return interface to show the results</i>
----------	-------------------------------------------------------------------------

---

**Description**

Perform Spearman's test and return interface to show the results

**Usage**

```
spearman(data, groups)
```

**Arguments**

data	Numeric, data frame or matrix: data for one gene or alternative splicing event
groups	List of characters (list of groups containing data identifiers) or character vector (group of each value in data)

**Value**

HTML elements

---

startProcess	<i>Signal the program that a process is starting</i>
--------------	------------------------------------------------------

---

**Description**

Style button to show processing is in progress

**Usage**

```
startProcess(id)
```

**Arguments**

id	Character: button identifier
----	------------------------------

**Value**

Start time of the process

---

startProgress	<i>Create a progress object</i>
---------------	---------------------------------

---

**Description**

Create a progress object

**Usage**

```
startProgress(message, divisions, global = if (isRunning()) sharedData  
else getHidden())
```

**Arguments**

message	Character: progress message
divisions	Integer: number of divisions in the progress bar
global	Shiny's global variable

**Value**

NULL (this function is used to modify the Shiny session's state or internal hidden variables)

---

`styleModal`*Style and show a modal*

---

**Description**

You can also use `errorModal` and `warningModal` to use a template modal already stylised to show errors and warnings, respectively.

**Usage**

```
styleModal(session, title, ..., style = NULL,  
  iconName = "exclamation-circle", footer = NULL, echo = FALSE,  
  size = "medium", dismissButton = TRUE, caller = NULL)
```

```
errorModal(session, title, ..., size = "small", footer = NULL,  
  caller = NULL)
```

```
warningModal(session, title, ..., size = "small", footer = NULL,  
  caller = NULL)
```

```
infoModal(session, title, ..., size = "small", footer = NULL,  
  caller = NULL)
```

**Arguments**

<code>session</code>	Current Shiny session
<code>title</code>	Character: modal title
<code>...</code>	Extra arguments to pass to <code>shiny::modalDialog</code>
<code>style</code>	Character: style of the modal (NULL, "warning", "error" or "info"; NULL by default)
<code>iconName</code>	Character: FontAwesome icon name to appear with the title
<code>footer</code>	HTML elements to use in footer
<code>echo</code>	Boolean: print to console? FALSE by default
<code>size</code>	Character: size of the modal - "medium" (default), "small" or "large"
<code>dismissButton</code>	Boolean: show dismiss button in footer? TRUE by default
<code>caller</code>	Character: label to identify the module calling for the modal (relevant for error and warning modals)

**Value**

NULL (this function is used to modify the Shiny session's state)

**See Also**

[showAlert](#)

---

subsetGeneExpressionFromMatchingGenes  
*Subset gene expression based on (full or partial) matching genes*

---

**Description**

Subset gene expression based on (full or partial) matching genes

**Usage**

```
subsetGeneExpressionFromMatchingGenes(geneExpr, gene)
```

**Arguments**

geneExpr	Data frame or matrix: gene expression
gene	Character: genes to look for

**Value**

Gene expression subset for the input genes

---

survdiff.survTerms      *Test differences between survival curves*

---

**Description**

Test differences between survival curves

**Usage**

```
survdiff.survTerms(survTerms, ...)
```

**Arguments**

survTerms	survTerms object: processed survival terms
...	Arguments passed on to <code>survival::survdiff</code>

**subset** expression indicating which subset of the rows of data should be used in the fit. This can be a logical vector (which is replicated to have length equal to the number of observations), a numeric vector indicating which observation numbers are to be included (or excluded if negative), or a character vector of row names to be included. All observations are included by default.

**na.action** a missing-data filter function. This is applied to the `model.frame` after any subset argument has been used. Default is `options()$na.action`.

**rho** a scalar parameter that controls the type of test.

**Value**

an object of class "survfit". See `survfit.object` for details. Methods defined for `survfit` objects are `print`, `plot`, `lines`, and `points`.

**Examples**

```

clinical <- read.table(text = "2549  NA ii  female
                             840  NA i   female
                             NA 1204 iv  male
                             NA  383 iv  female
                             1293  NA iii male
                             NA 1355 ii  male")
names(clinical) <- c("patient.days_to_last_followup",
                    "patient.days_to_death",
                    "patient.stage_event.pathologic_stage",
                    "patient.gender")
timeStart <- "days_to_death"
event <- "days_to_death"
formulaStr <- "patient.stage_event.pathologic_stage + patient.gender"
survTerms <- processSurvTerms(clinical, censoring="right", event, timeStart,
                              formulaStr=formulaStr)
survdiff.survTerms(survTerms)

```

---

survfit.survTerms      *Compute estimates of survival curves*

---

**Description**

Compute estimates of survival curves

**Usage**

```
## S3 method for class 'survTerms'
survfit(survTerms, ...)
```

**Arguments**

**survTerms**      survTerms object: processed survival terms

**...**            Arguments passed on to `survival::survfit.formula`

**weights**        The weights must be nonnegative and it is strongly recommended that they be strictly positive, since zero weights are ambiguous, compared to use of the subset argument.

**subset**         expression saying that only a subset of the rows of the data should be used in the fit.

**na.action**      a missing-data filter function, applied to the model frame, after any subset argument has been used. Default is `options()$na.action`.

**etype**          a variable giving the type of event. This has been superseded by multi-state Surv objects; see example below.

**id**             identifies individual subjects, when a given person can have multiple lines of data.

**istate**         for multi-state models, identifies the initial state of each subject

**timefix**        process times through the `aeqSurv` function to eliminate potential round-off issues.

**Value**

survfit object. See `survfit.object` for details. Methods defined for `survfit` objects are `print`, `plot`, `lines`, and `points`.

**Examples**

```
clinical <- read.table(text = "2549  NA ii  female
                             840  NA i   female
                             NA 1204 iv  male
                             NA  383 iv  female
                             1293  NA iii male
                             NA 1355 ii  male")
names(clinical) <- c("patient.days_to_last_followup",
                    "patient.days_to_death",
                    "patient.stage_event.pathologic_stage",
                    "patient.gender")
timeStart <- "days_to_death"
event <- "days_to_death"
formulaStr <- "patient.stage_event.pathologic_stage + patient.gender"
survTerms <- processSurvTerms(clinical, censoring="right", event, timeStart,
                              formulaStr=formulaStr)

require("survival")
survfit(survTerms)
```

---

tabDataset	<i>Creates a tabPanel template for a datatable with a title and description</i>
------------	---------------------------------------------------------------------------------

---

**Description**

Creates a `tabPanel` template for a datatable with a title and description

**Usage**

```
tabDataset(ns, title, tableId, columns, visCols, data,
           description = NULL)
```

**Arguments**

ns	Namespace function
title	Character: tab title
tableId	Character: id of the datatable
columns	Character: column names of the datatable
visCols	Boolean: visible columns
data	Data frame: dataset of interest
description	Character: description of the table (optional)

**Value**

HTML elements



---

table2html	<i>Create HTML table from data frame or matrix</i>
------------	----------------------------------------------------

---

**Description**

Create HTML table from data frame or matrix

**Usage**

```
table2html(data, rownames = TRUE, colnames = TRUE, class = NULL,  
           style = NULL, thead = FALSE)
```

**Arguments**

data	Data frame or matrix
rownames	Boolean: print row names?
colnames	Boolean: print column names?
class	Character: table class
style	Character: table style
thead	Boolean: add a thead tag to the first row?

**Value**

HTML elements

---

tableRow	<i>Create a row for a HTML table</i>
----------	--------------------------------------

---

**Description**

Create a row for a HTML table

**Usage**

```
tableRow(..., th = FALSE)
```

**Arguments**

...	Elements to include in the row
th	Boolean: is this row the table head?

**Value**

HTML elements

---

testGroupIndependence *Multiple independence tests between reference groups and list of groups*

---

### Description

Test multiple contingency tables comprised by two groups (one reference group and another containing remaining elements) and provided groups.

### Usage

```
testGroupIndependence(ref, groups, elements, pvalueAdjust = "BH")
```

### Arguments

ref	List of character: list of groups where each element contains the identifiers of respective elements
groups	List of characters: list of groups where each element contains the identifiers of respective elements
elements	Character: all available elements (if a data frame is given, its rownames will be used)
pvalueAdjust	Character: method used to adjust p-values (see Details)

### Details

The following methods for p-value adjustment are supported by using the respective string in the pvalueAdjust argument:

- none: Do not adjust p-values
- BH: Benjamini-Hochberg's method (false discovery rate)
- BY: Benjamini-Yekutieli's method (false discovery rate)
- bonferroni: Bonferroni correction (family-wise error rate)
- holm: Holm's method (family-wise error rate)
- hochberg: Hochberg's method (family-wise error rate)
- hommel: Hommel's method (family-wise error rate)

### Value

multiGroupIndependenceTest object, a data frame containing:

attribute	Name of the original groups compared against the reference groups
table	Contingency table used for testing
pvalue	Fisher's exact test's p-value

### See Also

[parseCategoricalGroups](#) and [plotGroupIndependence](#)

**Examples**

```
elements <- paste("patients", 1:10)
ref       <- elements[5:10]
groups   <- list(race=list(asian=elements[1:3],
                          white=elements[4:7],
                          black=elements[8:10]),
                region=list(european=elements[c(4, 5, 9)],
                            african=elements[c(6:8, 10)]))
groupTesting <- testGroupIndependence(ref, groups, elements)
# View(groupTesting)
```

---

```
testSingleIndependence
```

*Multiple independence tests between a reference group and list of groups*

---

**Description**

Uses Fisher's exact test.

**Usage**

```
testSingleIndependence(ref, groups, elements, pvalueAdjust = "BH")
```

**Arguments**

ref	Character: identifier of elements in reference group
groups	List of characters: list of groups where each element contains the identifiers of respective elements
elements	Character: all patient identifiers
pvalueAdjust	Character: method used to adjust p-values (see Details)

**Details**

The following methods for p-value adjustment are supported by using the respective string in the pvalueAdjust argument:

- none: Do not adjust p-values
- BH: Benjamini-Hochberg's method (false discovery rate)
- BY: Benjamini-Yekutieli's method (false discovery rate)
- bonferroni: Bonferroni correction (family-wise error rate)
- holm: Holm's method (family-wise error rate)
- hochberg: Hochberg's method (family-wise error rate)
- hommel: Hommel's method (family-wise error rate)

**Value**

Returns a groupIndependenceTest object: a list where each element is a list containing:

attribute	Name of the original groups compared against the reference groups
table	Contingency table used for testing
pvalue	Fisher's exact test's p-value

---

testSurvival	<i>Test the survival difference between groups of patients</i>
--------------	----------------------------------------------------------------

---

**Description**

Test the survival difference between groups of patients

**Usage**

```
testSurvival(survTerms, ...)
```

**Arguments**

survTerms	survTerms object: processed survival terms
...	Arguments passed on to <code>survival::survdiff</code>

**subset** expression indicating which subset of the rows of data should be used in the fit. This can be a logical vector (which is replicated to have length equal to the number of observations), a numeric vector indicating which observation numbers are to be included (or excluded if negative), or a character vector of row names to be included. All observations are included by default.

**na.action** a missing-data filter function. This is applied to the `model.frame` after any subset argument has been used. Default is `options()$na.action`.

**rho** a scalar parameter that controls the type of test.

**Value**

p-value of the survival difference or NA

**Note**

Instead of raising errors, an NA is returned

**Examples**

```
require("survival")
data <- aml
timeStart <- "event"
event <- "event"
followup <- "time"
data$event <- NA
data$event[aml$status == 1] <- aml$time[aml$status == 1]
censoring <- "right"
formulaStr <- "x"
survTerms <- processSurvTerms(data, censoring=censoring, event=event,
                             timeStart=timeStart, followup=followup,
                             formulaStr=formulaStr)

testSurvival(survTerms)
```

---

testSurvivalCutoff	<i>Test the survival difference between two survival groups given a cutoff</i>
--------------------	--------------------------------------------------------------------------------

---

### Description

Test the survival difference between two survival groups given a cutoff

### Usage

```
testSurvivalCutoff(cutoff, data, filter = TRUE, clinical, ...,
  session = NULL, survivalInfo = FALSE)
```

### Arguments

cutoff	Numeric: Cutoff of interest
data	Numeric: elements of interest to test against the cutoff
filter	Boolean or numeric: elements to use (all by default)
clinical	Data frame: clinical data
...	Arguments passed on to processSurvTerms
	<b>censoring</b> Character: censor using "left", "right", "interval" or "interval2"
	<b>scale</b> Character: rescale the survival time to "days", "weeks", "months" or "years"
	<b>formulaStr</b> Character: formula to use
	<b>coxph</b> Boolean: fit a Cox proportional hazards regression model? FALSE by default
	<b>survTime</b> survTime object: times to follow up, time start, time stop and event (optional)
	<b>event</b> Character: name of column containing time of the event of interest
	<b>timeStart</b> Character: name of column containing starting time of the interval or follow up time
	<b>timeStop</b> Character: name of column containing ending time of the interval (only relevant for interval censoring)
	<b>followup</b> Character: name of column containing follow up time
session	Shiny session
survivalInfo	Boolean: return extra survival information

### Value

p-value of the survival difference

---

textSuggestions      *Create script for auto-completion of text input*

---

**Description**

Uses the JavaScript library `jquery.textcomplete`

**Usage**

```
textSuggestions(id, words, novalue = "No matching value", char = " ")
```

**Arguments**

id	Character: input ID
words	Character: words to suggest
novalue	Character: string when there's no matching values
char	Character to succeed accepted word

**Value**

HTML string with the JavaScript script prepared to run

**Examples**

```
words <- c("tumor_stage", "age", "gender")
psychomics:::textSuggestions("textareaid", words)
```

---

toJSarray      *Convert vector of values to JavaScript array*

---

**Description**

Convert vector of values to JavaScript array

**Usage**

```
toJSarray(values)
```

**Arguments**

values	Character vector
--------	------------------

**Value**

Character with valid JavaScript array

---

transformData	<i>Transform data in data frame</i>
---------------	-------------------------------------

---

**Description**

Transform data in data frame

**Usage**

```
transformData(input, df, x, y)
```

**Arguments**

input	Shiny input
df	Data frame
x	Character: column name
y	Character: column name

**Value**

Data frame with transformed data in new columns and respective name of created columns

---

transformOptions	<i>Show variable transformation(s)</i>
------------------	----------------------------------------

---

**Description**

Show variable transformation(s)

**Usage**

```
transformOptions(label, type = NULL)
```

**Arguments**

label	Character: label to display
type	Character: show the variable transformation for the chosen type; NULL (by default) to show all variable transformations

**Value**

Character labelling variable transformation(s)

---

transformValues	<i>Transform values as per a given type of transformation</i>
-----------------	---------------------------------------------------------------

---

**Description**

Transform values as per a given type of transformation

**Usage**

```
transformValues(val, type, avoidZero = TRUE)
```

**Arguments**

val	Integer: values to transform
type	Character: type of transformation
avoidZero	Boolean: add the smallest non-zero number available to zero values; avoids returning infinity values during Log transformation (which are not plotted); useful for preserving p-values of 0, for instance; TRUE by default

**Value**

Integer containing transformed values

---

trimWhitespace	<i>Trims whitespace from a word</i>
----------------	-------------------------------------

---

**Description**

Trims whitespace from a word

**Usage**

```
trimWhitespace(word)
```

**Arguments**

word	Character to trim
------	-------------------

**Value**

Character without whitespace

**Examples**

```
psychomics::trimWhitespace(" hey there ")
psychomics::trimWhitespace(c("pineapple ", "one two three",
                             " sunken ship "))
```



---

ttest	<i>Perform unpaired t-test analysis and return interface to show the results</i>
-------	----------------------------------------------------------------------------------

---

**Description**

Perform unpaired t-test analysis and return interface to show the results

**Usage**

```
ttest(data, groups, stat = NULL)
```

**Arguments**

data	Numeric, data frame or matrix: data for one gene or alternative splicing event
groups	List of characters (list of groups containing data identifiers) or character vector (group of each value in data)
stat	Data frame or matrix: values of the analyses to be performed (if NULL, the analyses will be performed)

**Value**

HTML elements

---

uniqueBy	<i>Check unique rows of a data frame based on a set of its columns</i>
----------	------------------------------------------------------------------------

---

**Description**

Check unique rows of a data frame based on a set of its columns

**Usage**

```
uniqueBy(data, ...)
```

**Arguments**

data	Data frame or matrix
...	Name of columns

**Value**

Data frame with unique values based on set of columns

---

updateClinicalParams *Update available clinical attributes when the clinical data changes*

---

**Description**

Update available clinical attributes when the clinical data changes

**Usage**

```
updateClinicalParams(session, attrs)
```

**Arguments**

session	Shiny session
attrs	Character: patient attributes

**Value**

NULL (this function is used to modify the Shiny session's state)

---

updateFileBrowserInput  
*Change the value of a fileBrowserInput on the client*

---

**Description**

Change the value of a fileBrowserInput on the client

**Usage**

```
updateFileBrowserInput(session, id, ..., value = NULL)
```

**Arguments**

session	Shiny session
id	Character: input identifier
...	Additional arguments passed to <a href="#">fileBrowser</a> . Only used if value is NULL.
value	Character: file or directory path

**Details**

Sends a message to the client, telling it to change the value of the input object. For fileBrowserInput objects, this changes the value displayed in the text-field and triggers a client-side change event. A directory selection dialogue is not displayed.

**Value**

NULL (this function is used to modify the Shiny session's state)

**Source**

Original code by wleepang: <https://github.com/wleepang/shiny-directory-input>

---

updateProgress	<i>Update a progress object</i>
----------------	---------------------------------

---

**Description**

Update a progress object

**Usage**

```
updateProgress(message = "Loading...", value = NULL, max = NULL,  
  detail = NULL, divisions = NULL, global = if (isRunning())  
  sharedData else getHidden(), console = TRUE)
```

**Arguments**

message	Character: progress message
value	Integer: current progress value
max	Integer: maximum progress value
detail	Character: detailed message
divisions	Integer: number of divisions in the progress bar
global	Shiny's global variable
console	Boolean: print message to console? (TRUE by default)

**Details**

If divisions is not NULL, a progress bar is started with the given divisions. If value is NULL, the progress bar will be incremented by one; otherwise, the progress bar will be incremented by the integer given in value.

**Value**

NULL (this function is used to modify the Shiny session's state)

---

vennEvents	<i>Compare the number of events from the different programs in a Venn diagram</i>
------------	-----------------------------------------------------------------------------------

---

**Description**

Compare the number of events from the different programs in a Venn diagram

**Usage**

```
vennEvents(join, eventType)
```

**Arguments**

join	List of lists of data frame
eventType	Character: type of event

**Value**

Venn diagrams for a given event type

---

wilcox	<i>Perform Wilcoxon analysis and return interface to show the results</i>
--------	---------------------------------------------------------------------------

---

**Description**

Perform Wilcoxon analysis and return interface to show the results

**Usage**

```
wilcox(data, groups, stat = NULL)
```

**Arguments**

data	Numeric, data frame or matrix: data for one gene or alternative splicing event
groups	List of characters (list of groups containing data identifiers) or character vector (group of each value in data)
stat	Data frame or matrix: values of the analyses to be performed (if NULL, the analyses will be performed)

**Value**

HTML elements

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