

Package ‘bioCancer’

September 10, 2025

Title Interactive Multi-Omics Cancers Data Visualization and Analysis

Version 1.36.0

Date 2024-02-14

Description This package is a Shiny App to visualize and analyse interactively Multi-Assays of Cancer Genomic Data.

Depends R (>= 3.6.0), radiant.data (>= 0.9.1), cBioPortalData, XML(>= 3.98)

Imports R.oo, R.methodsS3, DT (>= 0.3), dplyr (>= 0.7.2), tidyr, shiny (>= 1.0.5), AlgDesign (>= 1.1.7.3), import (>= 1.1.0), methods, AnnotationDbi, shinythemes, Biobase, geNetClassifier, org.Hs.eg.db, org.Bt.eg.db, DOSE, clusterProfiler, reactome.db, ReactomePA, DiagrammeR(<= 1.01), visNetwork, htmlwidgets, plyr, tibble, GO.db

Suggests BiocStyle, prettydoc, rmarkdown, knitr, testthat (>= 0.10.0)

VignetteBuilder knitr

URL <https://kmezhound.github.io/bioCancer/>

BugReports <https://github.com/kmezhound/bioCancer/issues>

License AGPL-3 | file LICENSE

LazyData true

biocViews GUI, DataRepresentation, Network, MultipleComparison, Pathways, Reactome, Visualization, GeneExpression, GeneTarget

RoxygenNote 7.3.1

Encoding UTF-8

git_url <https://git.bioconductor.org/packages/bioCancer>

git_branch RELEASE_3_21

git_last_commit 89a66db

git_last_commit_date 2025-04-15

Repository Bioconductor 3.21

Date/Publication 2025-09-10

Author Karim Mezhoud [aut, cre]

Maintainer Karim Mezhoud <kmezhound@gmail.com>

Contents

.dbEscapeString	3
.getTableName	4
.pickRef	4
AnnotationFuncs	5
attriColorGene	6
attriColorValue	7
attriColorVector	8
attriShape2Gene	9
attriShape2Node	9
bioCancer	10
CGDS	10
checkDimensions	11
coffeewheel	12
coffeewheelOutput	12
displayTable	13
Edges_Diseases_obj	14
epiGenomics	15
findPhantom	15
getEvidenceCodes	16
getFreqMutData	16
getGenesClassification	17
getListProfData	18
getList_Cases	19
getList_GenProfs	20
getOrthologs	20
getProfData	22
getSequenced_SampleSize	23
mapLists	24
metabologram	25
metabologramOutput	26
Mutation_obj	26
Node_df_FreqIn	27
Node_Diseases_obj	28
Node_obj_CNA_ProfData	29
Node_obj_FreqIn	29
Node_obj_Met_ProfData	30
Node_obj_mRNA_Classifier	31
pickGO	32
pickRefSeq	33
removeNAs	34
renderCoffeewheel	35
renderMetabologram	36
reStrColorGene	36
reStrDimension	37
reStrDisease	38
returnTextAreaInput	39

<code>.getTableName</code>	<i>Gets the table name from the INPARANOID style genus names.</i>
----------------------------	---

Description

Gets the table name from the INPARANOID style genus names.

Usage

```
.getTableName(genus)
```

Arguments

genus	5 character INPARANOID genus name, such as "BOSTA", "HOMSA" or "MUSMU".
-------	---

Value

Table name for genus.

Author(s)

Stefan McKinnon Edwards <stefanm.edwards@agrsci.dk>

References

<https://www.bioconductor.org/packages/release/bioc/html/AnnotationDbi.html>

<code>.pickRef</code>	<i>Secret function that does the magic for pickRefSeq.</i>
-----------------------	--

Description

Do not use it, use [pickRefSeq!](#)

Usage

```
.pickRef(l, priorities, reduce = c("all", "first", "last"))
```

Arguments

l	List.
priorities	How to prioritize.
reduce	How to reduce.

Value

List.

Note

Hey, you found a secret function! Keep it that way!

Author(s)

Stefan McKinnon Edwards <stefan.hoj-edwards@agrsci.dk>

See Also

[pickRefSeq](#)

AnnotationFuncs

Annotation translation functions

Description

Package:	AnnotationFuncs
Type:	Package
Version:	1.3.0
Date:	2011-06-10
License:	GPL-2
LazyLoad:	yes

Details

Functions for handling translations between different identifiers using the Biocore Data Team data-packages (e.g. `org.Bt.eg.db`). Primary functions are [translate](#) for translating and [getOrthologs](#) for efficient lookup of homologues using the Inparanoid databases. Other functions include functions for selecting Refseqs or Gene Ontologies (GO).

Author(s)

Stefan McKinnon Edwards <stefan.hoj-edwards@agrsci.dk>

References

<https://www.iysik.com/index.php?page=annotation-functions>

See Also

[translate](#), [getOrthologs](#)

Examples

```
library(org.Bt.eg.db)
gene.symbols <- c('DRBP1', 'SERPINA1', 'FAKE', 'BLABLA')
# Find entrez identifiers of these genes.
eg <- translate(gene.symbols, org.Bt.egSYMBOL2EG)
# Note that not all symbols were translated.

# Go directly to Refseq identifiers.
refseq <- translate(gene.symbols, from=org.Bt.egSYMBOL2EG, to=org.Bt.egREFSEQ)
# Pick the proteins:
pickRefSeq(refseq, priorities=c('NP', 'XP'), reduce='all')
```

attriColorGene	<i>Attribute Color to Gene</i>
----------------	--------------------------------

Description

Attribute Color to Gene

Usage

```
attriColorGene(df)
```

Arguments

df data frame with mRNA or CNA or mutation frequency or methylation (numeric). Without sampleID column.

Value

A list colors for every gene

Examples

```
cgds <- cBioPortal(
  hostname = "www.cbioportal.org",
  protocol = "https",
  api = "/api/v2/api-docs"
)
## Not run:
getDataByGenes( api = cgds,
  studyId = "gbm_tcga_pub",
  genes = c("NF1", "TP53", "ABL1"),
  by = "hugoGeneSymbol",
  molecularProfileIds = "gbm_tcga_pub_mrna"
```

```
)  
  
## End(Not run)
```

attriColorValue	<i>Attribute Color to Value</i>
-----------------	---------------------------------

Description

Attribute Color to Value

Usage

```
attriColorValue(Value, df, colors=c(a,b,c),feet)
```

Arguments

- Value integer
- df data frame with numeric values
- colors a vector of 5 colors
- feet the interval between two successive colors in the palette (0.1)

Value

Hex Color Code

Examples

```
cgds <- cBioPortal(  
  hostname = "www.cbioportal.org",  
  protocol = "https",  
  api = "/api/v2/api-docs"  
)  
## Not run:  
getDataByGenes( api = cgds,  
  studyId = "gbm_tcga_pub",  
  genes = c("NF1", "TP53", "ABL1"),  
  by = "hugoGeneSymbol",  
  molecularProfileIds = "gbm_tcga_pub_mrna"  
)  
  
## End(Not run)
```

attriColorVector	<i>Attribute color to a vector of numeric values</i>
------------------	--

Description

Attribute color to a vector of numeric values

Usage

```
attriColorVector(Value, vector, colors=c(a,b,c),feet)
```

Arguments

Value	numeric
vector	A vector of numeric data
colors	3 colors
feet	An interval between two numeric value needed to change the color

Value

A vetor of colors

Examples

```
cgds <- cBioPortal(  
  hostname = "www.cbioportal.org",  
  protocol = "https",  
  api = "/api/v2/api-docs"  
)  
## Not run:  
getDataByGenes( api = cgds,  
  studyId = "gbm_tcga_pub",  
  genes = c("NF1", "TP53", "ABL1"),  
  by = "hugoGeneSymbol",  
  molecularProfileIds = "gbm_tcga_pub_mrna"  
)  
  
## End(Not run)
```

attriShape2Gene	<i>Attribute shape to nodes</i>
-----------------	---------------------------------

Description

Attribute shape to nodes

Usage

attriShape2Gene(gene, genelist)

Arguments

gene	Gene symbol
genelist	Gene list

Value

A character "BRCA1[shape = 'circle', "

Examples

```
how <- "runManually"
## Not run:
GeneList <- whichGeneList("73")
attriShape2Gene("P53", GeneList)
attriShape2Gene("GML", GeneList)

## End(Not run)
```

attriShape2Node	<i>Attributes shape to Nodes</i>
-----------------	----------------------------------

Description

Attributes shape to Nodes

Usage

attriShape2Node(gene, genelist)

Arguments

gene	symbol "TP53"
genelist	a vector of gene symbol

Value

A data frame with edges attributes

Examples

```
GeneList <- c("DKK3" , "NBN" , "MYO6" , "TP53" , "PML" , "IFI16" ,"BRCA1")
NodeShape <- attriShape2Gene("DKK3", GeneList)
```

bioCancer

Launch bioCancer with default browser

Description

The Main function to run bioCancer App

Usage

```
bioCancer()
```

Value

web page of bioCancer Shiny App

Examples

```
ShinyApp <- 1
## Not run:
bioCancer()

## End(Not run)
```

CGDS

CGDS connect object to cBioPortal

Description

Creates a CGDS connection object from a CGDS endpoint URL. This object must be passed on to the methods which query the server.

Usage

```
CGDS(url,verbose=FALSE,ploterrormsg='',token=NULL)
```

Arguments

url	A CGDS URL (required).
verbose	A boolean variable specifying verbose output (default FALSE)
ploterrormsg	An optional message to display in plots if an error occurs (default "")
token	An optional 'Authorization: Bearer' token to connect to cBioPortal instances that require authentication (default NULL)

checkDimensions	<i>Check wich Cases and genetic profiles are available for selected study</i>
-----------------	---

Description

Check wich Cases and genetic profiles are available for selected study

Usage

```
checkDimensions(StudyID)
```

Arguments

StudyID	Study reference using cBioPortal index
---------	--

Value

A data frame with two column (Cases, Genetic profiles). Every row has a dimension (CNA, mRNA...). The data frame is filled with yes/no response.

Examples

```
cgds <- cBioPortal(
  hostname = "www.cbioportal.org",
  protocol = "https",
  api = "/api/v2/api-docs"
)
## Not run:
getDataByGenes( api = cgds,
  studyId = "gbm_tcga_pub",
  genes = c("NF1", "TP53", "ABL1"),
  by = "hugoGeneSymbol",
  molecularProfileIds = "gbm_tcga_pub_mrna"
)

## End(Not run)
```

coffeewheel

This is an htmlwidgets-based visualization tool for hierarchical data. It is zoomable, meaning that you can interact with the hierarchy and zoom in/out accordingly.

Description

This is an htmlwidgets-based visualization tool for hierarchical data. It is zoomable, meaning that you can interact with the hierarchy and zoom in/out accordingly.

Usage

```
coffeewheel(treeData, width=600, height=600, main="", partitionAttribute="value")
```

Arguments

treeData	A hierarchical tree data as in example
width	600
height	600
main	Title
partitionAttribute	"value"

Value

A circular layout with genetic profile.

Examples

```
How <- "runManually"  
## Not run:  
  coffeewheel(treeData = sampleWheelData)  
  
## End(Not run)
```

coffeewheelOutput*Widget output function for use in Shiny*

Description

Widget output function for use in Shiny

Usage

```
coffeewheelOutput(outputId, width=700, height=700)
```

Arguments

outputId	id
width	700
height	700

Value

A circular layout with genetic profile in Shiny App.

Examples

```
How <- "runManually"
## Not run:
coffeewheel(treeData = sampleWheelData)

## End(Not run)
```

displayTable	<i>Display dataframe in table using DT package</i>
--------------	--

Description

Display dataframe in table using DT package

Usage

```
displayTable(df)
```

Arguments

df	a dataframe
----	-------------

Value

A table

Examples

```
cgds <- cBioPortal(
  hostname = "www.cbioportal.org",
  protocol = "https",
  api = "/api/v2/api-docs"
)
## Not run:
getDataByGenes( api = cgds,
  studyId = "gbm_tcga_pub",
  genes = c("NF1", "TP53", "ABL1"),
  by = "hugoGeneSymbol",
```

```
molecularProfileIds = "gbm_tcga_pub_mrna"
)

## End(Not run)
```

Edges_Diseases_obj	<i>get Edges dataframe for Gene/Disease association from geNetClassifier</i>
--------------------	--

Description

get Edges dataframe for Gene/Disease association from geNetClassifier

Usage

```
Edges_Diseases_obj(genesclassdetails)
```

Arguments

genesclassdetails
a dataframe from geNetClassifier

Value

A data frame with egdes attributes

Examples

```
GenesClassDetails <- structure(list(Genes = c("FANCF", "MLH1", "MSH2", "ATR", "PARP1",  
"CHEK2", "RAD51"), ranking = c(1L, 1L, 1L, 2L, 3L, 1L, 2L), class = c("brca_tcga",  
"gbm_tcga", "lihc_tcga", "lihc_tcga", "lihc_tcga", "lusc_tcga",  
"lusc_tcga"), postProb = c(1, 0.99, 1, 0.99, 0.99, 1,  
0.98), exprsMeanDiff = c(180, 256, -373, -268,  
-1482, 258, 143), exprsUpDw = c("UP", "UP", "DOWN",  
"DOWN", "DOWN", "UP", "UP")), .Names = c("Genes", "ranking",  
"class", "postProb", "exprsMeanDiff", "exprsUpDw"),  
class = "data.frame", row.names = c(NA,-7L))

Ed_Diseases_obj <- Edges_Diseases_obj(genesclassdetails=GenesClassDetails)
```

epiGenomics	<i>Default dataset of bioCancer</i>
-------------	-------------------------------------

Description

Default dataset of bioCancer

Usage

```
epiGenomics
```

Format

An object of class `data.frame` with 48 rows and 7 columns.

Author(s)

Karim Mezhoud <kmezhoud@gmail.com>

findPhantom	<i>Check if PhantomJS is installed. Similar to webshot</i>
-------------	--

Description

Check if PhantomJS is installed. Similar to webshot

Usage

```
findPhantom()
```

Value

Logic object

Examples

```
How <- "runManually"
## Not run:
findPhantom()

## End(Not run)
```

getEvidenceCodes	Returns GO evidence codes.
------------------	----------------------------

Description

Returns GO evidence codes.

Usage

```
getEvidenceCodes()
```

Value

Matrix of two columns, first column with codes, second column with description of codes.

Author(s)

Stefan McKinnon Edwards <stefan.hoj-edwards@agrsci.dk>

References

?org.Bt.egGO

See Also

[pickGO](#)

Examples

```
getEvidenceCodes()
```

getFreqMutData	get mutation frequency
----------------	------------------------

Description

get mutation frequency

Usage

```
getFreqMutData(list, geneListLabel)
```

Arguments

list	a list of data frame with mutation data. Each data frame is for one study
geneListLabel	file name of geneList examples: "73"

Value

a data frame with mutation frequency. gene is in rows and study is in column

Examples

```
cgds <- cBioPortal(
  hostname = "www.cbioportal.org",
  protocol = "https",
  api = "/api/v2/api-docs"
)
## Not run:
getDataByGenes( api = cgds,
  studyId = "gbm_tcga_pub",
  genes = c("NF1", "TP53", "ABL1"),
  by = "hugoGeneSymbol",
  molecularProfileIds = "gbm_tcga_pub_mrna"
)

## End(Not run)
```

getGenesClassification

get genes classification

Description

get genes classification

Usage

```
getGenesClassification(chetked_Studies, GeneList,
  samplesize, threshold, listGenProfs, listCases)
```

Arguments

checked_Studies	checked studies
GeneList	gene list
samplesize	sample size
threshold	p-value threshold
listGenProfs	list of genetic profiles
listCases	list of cases

Value

A table with genes classed by study

Examples

```

cgds <- cBioPortal(
  hostname = "www.cbioportal.org",
  protocol = "https",
  api = "/api/v2/api-docs"
)
## Not run:
getDataByGenes( api = cgds,
  studyId = "gbm_tcga_pub",
  genes = c("NF1", "TP53", "ABL1"),
  by = "hugoGeneSymbol",
  molecularProfileIds = "gbm_tcga_pub_mrna"
)

## End(Not run)

```

getListProfData	<i>get list of data frame with profiles data (CNA,mRNA, Methylation, Mutation...)</i>
-----------------	---

Description

get list of data frame with profiles data (CNA,mRNA, Methylation, Mutation...)

Usage

```
getListProfData(checked_Studies, geneListLabel)
```

Arguments

checked_Studies	checked studies in corresponding panel (input\$StudiesIDCircos, input\$StudiesIDReactome).
geneListLabel	The label of GeneList. There are three cases: "Genes" user gene list, "Reactome_GeneList" GeneList plus genes from reactomeFI "file name" from Examples

Value

A LIST of profiles data (CNA, mRNA, Methylation, Mutation, miRNA, RPPA). Each dimension content a list of studies.

Examples

```

cgds <- cBioPortal(
  hostname = "www.cbioportal.org",
  protocol = "https",
  api = "/api/v2/api-docs"
)

```

```

)
## Not run:
getDataByGenes( api = cgds,
  studyId = "gbm_tcga_pub",
  genes = c("NF1", "TP53", "ABL1"),
  by = "hugoGeneSymbol",
  molecularProfileIds = "gbm_tcga_pub_mrna"
)

## End(Not run)

```

getList_Cases

get list of cases of each selected study in Classifier panel

Description

get list of cases of each selected study in Classifier panel

Usage

```
getList_Cases(checked_Studies)
```

Arguments

checked_Studies
checked studies

Value

A list of cases

Examples

```

cgds <- cBioPortal(
  hostname = "www.cbioportal.org",
  protocol = "https",
  api = "/api/v2/api-docs"
)
## Not run:
getDataByGenes( api = cgds,
  studyId = "gbm_tcga_pub",
  genes = c("NF1", "TP53", "ABL1"),
  by = "hugoGeneSymbol",
  molecularProfileIds = "gbm_tcga_pub_mrna"
)

## End(Not run)

```

getList_GenProfs	<i>get list of genetic profiles of each selected study in Classifier panel</i>
------------------	--

Description

get list of genetic profiles of each selected study in Classifier panel

Usage

```
getList_GenProfs(checked_Studies)
```

Arguments

checked_Studies
checked studies

Value

A list of genetics profiles

Examples

```
cgds <- cBioPortal(
  hostname = "www.cbioportal.org",
  protocol = "https",
  api = "/api/v2/api-docs"
)
## Not run:
getDataByGenes( api = cgds,
  studyId = "gbm_tcga_pub",
  genes = c("NF1", "TP53", "ABL1"),
  by = "hugoGeneSymbol",
  molecularProfileIds = "gbm_tcga_pub_mrna"
)

## End(Not run)
```

getOrthologs	<i>Performs quicker lookup for orthologs in homologue data packages</i>
--------------	---

Description

Using the INPARANOID data packages such as `hom.Hs.inp.db` is very, very slow and can take up to 11 min (on this particular developers workstation). This function introduces a new method that can do it in just 20 seconds (on the developers workstation). In addition, it includes options for translating between different identifiers both before and after the mapping.

Usage

```
getOrthologs(
  values,
  mapping,
  genus,
  threshold = 1,
  pre.from = NULL,
  pre.to = NULL,
  post.from = NULL,
  post.to = NULL,
  ...
)
```

Arguments

values	Vector, coerced to character vector, of values needed mapping by homology.
mapping	Homology mapping object, such as <code>hom.Hs.inpBOSTA</code> or <code>revmap(hom.Hs.inpBOSTA)</code> .
genus	Character vector. 5 character INPARANOID style genus name of the mapping object, e.g. 'BOSTA' for both <code>hom.Hs.inpBOSTA</code> and <code>revmap(hom.Hs.inpBOSTA)</code> .
threshold	Numeric value between 0 and 1. Only clustered homologues with a pairwise score above the threshold is included. The native implementation has this set to 1.
pre.from	Mapping object if values needs translation before mapping. E.g. values are entrez and <code>hom.Hs.inpBOSTA</code> requires ENSEMBLPROT, <code>hom.Hs.inpAPIME</code> requires Refseq (?). Arguments from and to are just like in translate .
pre.to	Second part of translation before mapping.
post.from	Translate the result from homology mapping to a desired id; just like in translate .
post.to	Second part of translation after mapping.
...	Additional arguments sent to translate .

Value

List. Names of list corresponds to values, except those that could not be mapped nor translated. Entries are character vectors.

Author(s)

Stefan McKinnon Edwards <stefan.hoj-edwards@agrsci.dk>

References

?`hom.Hs.inp.db` - <https://inparanoidb.sbc.su.se/>

Berglund, A.C., Sjolund, E., Ostlund, G., Sonnhammer, E.L.L. (2008) InParanoid 6: eukaryotic ortholog clusters with inparalogs *Nucleic Acids Res.* **36**:D263–266

O'Brien, K.P., Mado, R., Sonnhammer, E.L.L (2005) Inparanoid: A Comprehensive Database of Eukaryotic Orthologs *NAR* **33**:D476–D480

Remm, M., Storm, C.E.V, Sonnhammer, E.L.L (2001) Automatic clustering of orthologs and in-paralogs from pairwise species comparisons *J. Mol. Biol.* **314**:1041–1052

See Also

[translate](#), [.getTableNames](#), [mapLists](#)

Examples

```
tmp <-1
```

getProfData	<i>search and get genetic profiles (CNA,mRNA, Methylation, Mutation...)</i>
-------------	---

Description

search and get genetic profiles (CNA,mRNA, Methylation, Mutation...)

Usage

```
getProfData(study,genProf, listGenProf, GeneList, Mut)
```

Arguments

study	Study ID
genProf	Genetic Profile id (cancer_study_id_[mutations, cna, methylation, mrna]).
listGenProf	A list of Genetic Profiles for one study.
GeneList	A list of genes
Mut	Condition to set if the genetic profile is mutation or not (0,1)

Details

See <https://github.com/kmezhoud/bioCancer/wiki>

Value

A data frame with Genetic profile

Examples

```
cgds <- cBioPortal(  
  hostname = "www.cbioportal.org",  
  protocol = "https",  
  api = "/api/v2/api-docs"  
)  
## Not run:  
getDataByGenes( api = cgds,  
  studyId = "gbm_tcga_pub",  
  genes = c("NF1", "TP53", "ABL1"),  
  by = "hugoGeneSymbol",  
  molecularProfileIds = "gbm_tcga_pub_mrna"  
)  
  
## End(Not run)
```

getSequenced_SampleSize

get samples size of sequenced genes

Description

get samples size of sequenced genes

Usage

```
getSequenced_SampleSize(StudiesID)
```

Arguments

StudiesID Studies ID as a vector

Value

dataframe with sample size for each selected study.

Examples

```
## Not run:  
sampleSize <- getSequenced_SampleSize(input$StudiesIDCircos)  
  
## End(Not run)
```

`mapLists`*Replaces contents of list A with elements of list B*

Description

Combines two lists, A and B, such that `names(A)` are preserved, mapping to the values of B, using `names(B)` as look up. Ie. replaces values in A with values in B, using `names(B)` as look up for values in A. Once more? See examples. *NB!* None-mapped entries are returned as NA, but can be removed using [removeNAs](#).

Usage

```
mapLists(A, B, removeNAs = TRUE)
```

Arguments

A	List, elements are coerced to character for mapping to B.
B	List.
removeNAs	Boolean, whether to remove the NAs that occur because an element was not found in B.

Value

List.

Author(s)

Stefan McKinnon Edwards <stefan.hoj-edwards@agrsci.dk>

See Also

[removeNAs](#)

Examples

```
A <- list('a1'='alpha', 'a2'='beta', 'a3'=c('gamma', 'delta'))
B <- list('alpha'='b1', 'gamma'=c('b2', 'b3'), 'delta'='b4')
mapLists(A, B)
```


metabologram

*Circular plot of hierarchital data of genetic profile.***Description**

Circular plot of hierarchital data of genetic profile.

Usage

```
metabologram(treeData,width=600,height=600,main="",showLegend=FALSE,
             legendBreaks=NULL,
             legendColors=NULL,
             fontSize=12,
             legendText="Legend")
```

Arguments

treeData	A hierarchical tree data as in example
width	600
height	600
main	Title
showLegend	FALSE
legendBreaks	NULL
legendColors	NULL
fontSize	12
legendText	Legend

Value

A circular layout with genetic profile.

See Also

<https://github.com/armish/metabologram>

Examples

```
How <- "runManually"
## Not run:
metabologram(treeData = sampleWheelData, width=600,
             height=600, main="title", showLegend = TRUE, fontSize = 10,
             legendBreaks=c("NA","Min","Negative", "0", "Positive", "Max"),
             legendColors=c("black","blue","cyan","white","yellow","red") ,
             legendText="Legend")

## End(Not run)
```

metabologramOutput	<i>Widget output function for use in Shiny</i>
--------------------	--

Description

Widget output function for use in Shiny

Usage

```
metabologramOutput(outputId, width = 600, height = 500)
```

Arguments

outputId	id
width	600
height	600

Value

A circular plot with genetic profile in Shiny App.

Examples

```
## Not run:
library(bioCancer)
bioCancer::metabologram(treeData = sampleMetabologramData)

## End(Not run)
```

Mutation_obj	<i>Attribute mutation frequency to nodes</i>
--------------	--

Description

Attribute mutation frequency to nodes

Usage

```
Mutation_obj(list,FreqMutThreshold, geneListLabel)
```

Arguments

list	A list of data frame with mutation data. Each data frame to study
FreqMutThreshold	threshold Rate of cases (patients) having mutation (0-1).
geneListLabel	file name of geneList examples: "73"

Value

A dat frame with mutation frequency. Ech column corresponds to a study.

Examples

```
cgds <- cBioPortal(
  hostname = "www.cbioportal.org",
  protocol = "https",
  api = "/api/v2/api-docs"
)
## Not run:
getDataByGenes( api = cgds,
  studyId = "gbm_tcga_pub",
  genes = c("NF1", "TP53", "ABL1"),
  by = "hugoGeneSymbol",
  molecularProfileIds = "gbm_tcga_pub_mrna"
)

## End(Not run)
```

Node_df_FreqIn

*Attributes size to Nodes depending on number of interaction***Description**

Attributes size to Nodes depending on number of interaction

Usage

```
Node_df_FreqIn(genelist, freqIn)
```

Arguments

genelist	a vector of genes
freqIn	dataframe with Node interaction frequencies

Value

A data frame with nodes size attributes

Examples

```
Node_df_FreqIn
## Not run:
r_data <- new.env()
r_data[["FreqIn"]] <- structure(list(Genes = c("ATM", "ATR", "BRCA1", "BRCA2", "CHEK1",
"CHEK2", "FANCF", "MDC1", "RAD51"), FreqSum = c(0.04, 0.05, 0.05,
0.03, 0.05, 0.04, 0.03, 0.03, 0.02)), .Names = c("Genes", "FreqSum"),
```

```

class = "data.frame", row.names = c(NA, -9L))
GeneList <- whichGeneList("DNA_damage_Response")
node_df <- Node_df_FreqIn(GeneList, r_data$FreqIn)

## End(Not run)

```

Node_Diseases_obj	<i>Attributes color and shape to Nodes of Diseases</i>
-------------------	--

Description

Attributes color and shape to Nodes of Diseases

Usage

```
Node_Diseases_obj(genesclasssdetails)
```

Arguments

`genesclasssdetails`
a dataframe from `geNetClassifier` function

Value

A data frame with nodes Shapes and colors

Examples

```

GenesClassDetails <- structure(list(Genes = c("FANCF", "MLH1", "MSH2", "ATR", "PARP1",
"CHEK2", "RAD51"), ranking = c(1L, 1L, 1L, 2L, 3L, 1L, 2L), class = c("brca_tcga",
"gbm_tcga", "lihc_tcga", "lihc_tcga", "lihc_tcga", "lusc_tcga",
"lusc_tcga"), postProb = c(1, 0.99, 1, 0.99, 0.99, 1,
0.98), exprsMeanDiff = c(180, 256, -373, -268,
-1482, 258, 143), exprsUpDw = c("UP", "UP", "DOWN",
"DOWN", "DOWN", "UP", "UP")), .Names = c("Genes", "ranking",
"class", "postProb", "exprsMeanDiff", "exprsUpDw"),
class = "data.frame", row.names = c(NA, -7L))
Node_Diseases_df <- Node_Diseases_obj(genesclasssdetails= GenesClassDetails)

```

Node_obj_CNA_ProfData *Attribute CNA data to node border*

Description

Attribute CNA data to node border

Usage

```
Node_obj_CNA_ProfData(list)
```

Arguments

list A list of data frame with CNA data. Each data frame corresponds to a study.

Value

A data frame with node border attributes

Examples

```
cgds <- cBioPortal(
  hostname = "www.cbioportal.org",
  protocol = "https",
  api = "/api/v2/api-docs"
)
## Not run:
getDataByGenes( api = cgds,
  studyId = "gbm_tcga_pub",
  genes = c("NF1", "TP53", "ABL1"),
  by = "hugoGeneSymbol",
  molecularProfileIds = "gbm_tcga_pub_mrna"
)

## End(Not run)
```

Node_obj_FreqIn *Attribute interaction frequency to node size*

Description

Attribute interaction frequency to node size

Usage

```
Node_obj_FreqIn(geneList)
```

Arguments

geneList A list of gene symbol

Value

A data frame with node attributes

Examples

```
r_data <- new.env()
r_data[["FreqIn"]] <- structure(list(Genes = c("ATM", "ATR", "BRCA1", "BRCA2", "CHEK1",
"CHEK2", "FANCF", "MDC1", "RAD51"), FreqSum = c(0.04, 0.05, 0.05,
0.03, 0.05, 0.04, 0.03, 0.03, 0.02)), .Names = c("Genes", "FreqSum"),
class = "data.frame", row.names = c(NA, -9L))
## Not run:
GeneList <- whichGeneList("DNA_damage_Response")
nodeObj <- Node_obj_FreqIn(GeneList)

## End(Not run)
```

Node_obj_Met_ProfData *Attribute gene Methylation to Nodes*

Description

Attribute gene Methylation to Nodes

Usage

```
Node_obj_Met_ProfData(list, type, threshold)
```

Arguments

list a list of data frame with methylation data

type HM450 or HM27

threshold the Rate cases (patients) that have a silencing genes by methylation

Value

a data frame with node shape attributes

Examples

```

cgds <- cBioPortal(
  hostname = "www.cbioportal.org",
  protocol = "https",
  api = "/api/v2/api-docs"
)
## Not run:
getDataByGenes( api = cgds,
  studyId = "gbm_tcga_pub",
  genes = c("NF1", "TP53", "ABL1"),
  by = "hugoGeneSymbol",
  molecularProfileIds = "gbm_tcga_pub_mrna"
)

## End(Not run)

```

Node_obj_mRNA_Classifier

Attribute genes expression to color nodes

Description

Attribute genes expression to color nodes

Usage

```
Node_obj_mRNA_Classifier(geneList, genesclassdetails)
```

Arguments

geneList A gene list.
genesclassdetails A dataframe with genes classes and genes expression.

Value

A data frame with node color attributes

Examples

```

r_data <- new.env()
input <- NULL

r_data[["FreqIn"]] <- structure(list(Genes = c("ATM", "ATR", "BRCA1", "BRCA2", "CHEK1",
"CHEK2", "FANCF", "MDC1", "RAD51"), FreqSum = c(0.04, 0.05, 0.05,
0.03, 0.05, 0.04, 0.03, 0.03, 0.02)), .Names = c("Genes", "FreqSum"),
class = "data.frame", row.names = c(NA, -9L))

```


See Also

[pickRefSeq](#), [getEvidenceCodes](#), [translate](#)

Examples

```
library(org.Bt.eg.db)
genes <- c(280705, 280706, 100327208)
translate(genes, org.Bt.egSYMBOL)

symbols <- c("SERPINA1", "KERA", "CD5")
refseq <- translate(symbols, from=org.Bt.egSYMBOL2EG, to=org.Bt.egREFSEQ)
# Pick the proteins:
pickRefSeq(refseq, priorities=c('NP', 'XP'), reduce='all')

# If you wanted to do some further mapping on the result from
# translate, simply use lapply.

library(GO.db)
GO <- translate(genes, org.Bt.egGO)
# Get all biological processes:
## Not run:
pickGO(GO, category='BP')
# $`280705`
# [1] "GO:0006826" "GO:0006879"
# $`280706`
# [1] "GO:0006590" "GO:0007165" "GO:0042446"
# Get all ontologies with experimental evidence:
pickGO(GO, evidence=c('IMP', 'IGI', 'IPI', 'ISS', 'IDA', 'IEP', 'IEA'))
# $`280705`
# [1] "GO:0006826" "GO:0006879" "GO:0005615" "GO:0008199"
# $`280706`
# [1] "GO:0006590" "GO:0007165" "GO:0042446" "GO:0005615" "GO:0005179" "GO:0042393"

## End(Not run)
```

pickRefSeq

Picks a prioritised RefSeq identifier from a list of identifiers

Description

When translating to RefSeq, typically multiple identifiers are returned, referring to different types of products, such as genomic molecule, mature mRNA or the protein, and they can be predicted, properties that can be read from the prefix (<https://www.ncbi.nlm.nih.gov/refseq/>). E.g. "XM_" is predicted mRNA and "NP_" is a protein. Run ?org.Bt.egREFSEQ.

Usage

```
pickRefSeq(
  1,
```

```

priorities = c("NP", "XP", "NM", "XM"),
reduce = c("all", "first", "last")
)

```

Arguments

l	Vector or list of RefSeqs accessions to pick from. If list given, applies the prioritisation to each element in the list.
priorities	Character vector of prioritised prefixes to pick by. Eg. <code>c("NP", "NM")</code> returns RefSeqs starting 'NP', and if none found, those starting 'NM'. If no RefSeqs are found according to the priorities, Null is returned, unless the last element in priorities is '*'. Uses <code>grepl</code> , so see these for pattern matching. Default: <code>c('NP','XP','NM','XM')</code>
reduce	Reducing method, either return all annotations (one-to-many relation) or the first or last found annotation. The reducing step is applied after translating to the goal: <code>all</code> : returns all annotations <code>first</code> or <code>last</code> : choose first or last of arbitrarily ordered list.

Value

If vector given, returns vector. If list given, returns list without element where nothing could be picked.

Author(s)

Stefan McKinnon Edwards <stefan.hoj-edwards@agrsci.dk>

Examples

```

library(org.Bt.eg.db)
symbols <- c("SERPINA1", "KERA", "CD5")
refseq <- translate(symbols, from=org.Bt.egSYMBOL2EG, to=org.Bt.egREFSEQ)
mRNA <- pickRefSeq(refseq, priorities=c('NM','XM'))
proteins <- pickRefSeq(refseq, priorities=c('NP','XP'))

```

removeNAs

Removes entries equal NA from list or vector

Description

Removes entries equal NA, but not mixed entries containing, amongst others, NA. Good for use after [mapLists](#) that might return entries equal NA.

Usage

```
removeNAs(l)
```

Arguments

1 Vector or list.

Author(s)

Stefan McKinnon Edwards <stefan.hoj-edwards@agrsci.dk>

Examples

```
removeNAs(list('a'=NA, 'b'=c(NA, 'B'), 'c'='C'))
```

renderCoffeewheel	<i>Widget render function for use in Shiny</i>
-------------------	--

Description

Widget render function for use in Shiny

Usage

```
renderCoffeewheel(expr, env = parent.frame(), quoted = FALSE)
```

Arguments

expr	id
env	parent.frame()
quoted	FALSE

Value

A circular layout with genetic profile in Shiny App.

Examples

```
How <- "runManually"  
## Not run:  
coffeewheel(treeData = sampleWheelData)  
  
## End(Not run)
```

renderMetabologram	<i>Widget render function for use in Shiny</i>
--------------------	--

Description

Widget render function for use in Shiny

Usage

```
renderMetabologram(expr, env= parent.frame(), quoted = FALSE)
```

Arguments

expr	expression
env	parent.frame()
quoted	FALSE

Value

A circular plot with genetic profile in Shiny App.

Examples

```
## Not run:
library(bioCancer)
bioCancer::metabologram(treeData = sampleMetabologramData)

## End(Not run)
```

reStrColorGene	<i>Restructure the list of color attributed to the genes in every dimension for every studies</i>
----------------	---

Description

Restructure the list of color attributed to the genes in every dimension for every studies

Usage

```
reStrColorGene(df)
```

Arguments

df	data frame with colors attributed to the genes
----	--

Value

Hierarchical color attribute: gene > color

Examples

```
cgds <- cBioPortal(
  hostname = "www.cbioportal.org",
  protocol = "https",
  api = "/api/v2/api-docs"
)
## Not run:
getDataByGenes( api = cgds,
  studyId = "gbm_tcga_pub",
  genes = c("NF1", "TP53", "ABL1"),
  by = "hugoGeneSymbol",
  molecularProfileIds = "gbm_tcga_pub_mrna"
)

## End(Not run)
```

reStrDimension	<i>Restructure the list of color attributed to the genes in every study for every dimensions</i>
----------------	--

Description

Restructure the list of color attributed to the genes in every study for every dimensions

Usage

```
reStrDimension(LIST)
```

Arguments

LIST list of hierarchical dimensions

Value

Hierarchical structure of: Study > dimensions > gene > color

Examples

```
cgds <- cBioPortal(
  hostname = "www.cbioportal.org",
  protocol = "https",
  api = "/api/v2/api-docs"
)
## Not run:
getDataByGenes( api = cgds,
```

```

studyId = "gbm_tcga_pub",
genes = c("NF1", "TP53", "ABL1"),
by = "hugoGeneSymbol",
molecularProfileIds = "gbm_tcga_pub_mrna"
)

## End(Not run)

```

reStrDisease

Restructure the list of color attributed to the genes in every disease

Description

Restructure the list of color attributed to the genes in every disease

Usage

```
reStrDisease(List)
```

Arguments

List of data frame with color attributes

Value

Hierarchy of dimensions in the same study: dimensions > gene > color

Examples

```

cgds <- cBioPortal(
  hostname = "www.cbioportal.org",
  protocol = "https",
  api = "/api/v2/api-docs"
)
## Not run:
getDataByGenes( api = cgds,
  studyId = "gbm_tcga_pub",
  genes = c("NF1", "TP53", "ABL1"),
  by = "hugoGeneSymbol",
  molecularProfileIds = "gbm_tcga_pub_mrna"
)

## End(Not run)

```

returnTextAreaInput	<i>Return message when the filter formula is not correct (mRNA > 500)</i>
---------------------	--

Description

Return message when the filter formula is not correct (mRNA > 500)

Usage

```
returnTextAreaInput(inputId,  
                    label= NULL,  
                    rows = 2,  
                    placeholder = NULL,  
                    resize= "vertical",  
                    value = "")
```

Arguments

inputId	The ID of the object
label	Text describes the box area
rows	Number of rows
placeholder	Error message if needed
resize	orientation of text
value	default text in the area box

Value

text message

Examples

```
ShinyApp <- 1  
## Not run:  
returnTextAreaInput(inputId = "data-filter",  
                    label = "Error message",  
                    rows = 2,  
                    placeholder = "Provide a filter (e.g., Genes == 'ATM') and press return",  
                    resize = "vertical",  
                    value="")  
  
## End(Not run)
```

Studies_obj	<i>get object for grViz. Link Studies to genes</i>
-------------	--

Description

get object for grViz. Link Studies to genes

Usage

```
Studies_obj(df)
```

Arguments

df	data frame with gene classes
----	------------------------------

Value

grViz object. a data frame with Study attributes

Examples

```
Studies_obj(data.frame("col1", "col2", "col3", "col4", "col5", "col6"))
## Not run:
Genes ranking      class postProb exprsMeanDiff exprsUpDw
1 FANCF           1 brca_tcga  1.00000      179.9226      UP
2 MLH1            1 gbm_tcga   0.99703      256.3173      UP

## End(Not run)
```

switchButton	<i>A function to change the Original checkbox of rshiny into a nice true/false or on/off switch button No javascript involved. Only CSS code.</i>
--------------	---

Description

To be used with CSS script 'button.css' stored in a 'www' folder in your Shiny app folder

Usage

```
switchButton(inputId, label = NULL, value = FALSE, col = "GB", type = "TF")
```


Arguments

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 (TRUE or FALSE).
col	Color set of the switch button. Choose between "GB" (Grey-Blue) and "RG" (Red-Green)
type	Text type of the button. Choose between "TF" (TRUE - FALSE), "OO" (ON - OFF) or leave empty for no text.

test.CGDS	<i>S3 method to test cBioPortal connection</i>
-----------	--

Description

S3 method to test cBioPortal connection

Usage

```
## S3 method for class 'CGDS'
test(x, ...)
```

Arguments

x	connection object
...	not used

translate	<i>Translate between different identifiers</i>
-----------	--

Description

Function for translating from one annotation to another, eg. from RefSeq to Ensemble. This function takes a vector of annotation values and translates first to the primary annotation in the Biocore Data Team package (ie. entrez gene identifier for org.Bt.eg.db) and then to the desired product, while removing non-translated annotations and optionally reducing the result so there is only a one-to-one relation.

Usage

```
translate(
  values,
  from,
  to = NULL,
  reduce = c("all", "first", "last"),
  return.list = TRUE,
  remove.missing = TRUE,
  simplify = FALSE,
  ...
)
```

Arguments

<code>values</code>	Vector of annotations that needs translation. Coerced to character vector.
<code>from</code>	Type of annotation values are given in. NB! take care in the orientation of the package, ie. if you have RefSeq annotations, use <code>org.Bt.egREFSEQ2EG</code> or (in some cases) <code>revmap(org.Bt.egREFSEQ)</code> .
<code>to</code>	Desired goal, eg. <code>org.Bt.egENSEMBLPROT</code> . If <code>NULL</code> (default), goal if the packages primary annotation (eg. <code>entrez gene</code> for <code>org.Bt.eg.db</code>). Throws a warning if the organisms in <code>from</code> and <code>to</code> are not the same.
<code>reduce</code>	Reducing method, either return all annotations (one-to-many relation) or the first or last found annotation. The reducing step is applied after translating to the goal: <code>all</code> : returns all annotations <code>first</code> or <code>last</code> : choose first or last of arbitrarily ordered list.
<code>return.list</code>	Logical, when <code>TRUE</code> , returns the translation as a list where names
<code>remove.missing</code>	Logical, whether to remove non-translated values, defaults <code>TRUE</code> .
<code>simplify</code>	Logical, unlists the result. Defaults to <code>FALSE</code> . Usefull when using <code>translate</code> in a <code>lapply</code> or <code>sapply</code> .
<code>...</code>	Additional arguments sent to pickGO if <code>from</code> returns GO set.

Details

If you want to do some further mapping on the result, you will have to use either `unlist` or `lapply`, where the first returns all the end-products of the first mapping, returning a new list, and the latter produces a list-within-list.

If `from` returns GO identifiers (e.g. `from = org.Bt.egGO`), then the returned resultset is more complex and consists of several layers of lists instead of the usual list of character vectors. If `to` has also been specified, the GO IDs must be extracted (internally) and you have the option of filtering for evidence and category at this point. See [pickGO](#).

Value

List; names of elements are `values` and the elements are the translated elements, or `NULL` if not translatable with `remove.missing = TRUE`.

Note

Requires user to deliver the annotation packages such as `org.Bt.egREFSEQ`.

Author(s)

Stefan McKinnon Edwards <stefan.hoj-edwards@agrsci.dk>

See Also

[pickRefSeq](#), [pickGO](#)

Examples

```
library(org.Bt.eg.db)
genes <- c(280705, 280706, 100327208)
translate(genes, org.Bt.egSYMBOL)

symbols <- c("SERPINA1", "KERA", "CD5")
refseq <- translate(symbols, from=org.Bt.egSYMBOL2EG, to=org.Bt.egREFSEQ)
# Pick the proteins:
pickRefSeq(refseq, priorities=c('NP', 'XP'), reduce='all')

# If you wanted to do some further mapping on the result from
# translate, simply use lapply.

library(GO.db)
GO <- translate(genes, org.Bt.egGO)
```

UnifyRowNames

Unify row names in data frame with the same order of gene list.

Description

Unify row names in data frame with the same order of gene list.

Usage

```
UnifyRowNames(x, geneList)
```

Arguments

<code>x</code>	data frame with gene symbol in the row name
<code>geneList</code>	a gene list

Value

a data frame having the gene in row name ordered as in gene list.

Examples

```

cgds <- cBioPortal(
  hostname = "www.cbioportal.org",
  protocol = "https",
  api = "/api/v2/api-docs"
)
## Not run:
getDataByGenes( api = cgds,
  studyId = "gbm_tcga_pub",
  genes = c("NF1", "TP53", "ABL1"),
  by = "hugoGeneSymbol",
  molecularProfileIds = "gbm_tcga_pub_mrna"
)

## End(Not run)

```

user_CNA

*Example of Copy Number Alteration (CNA) dataset***Description**

Example of Copy Number Alteration (CNA) dataset

Usage

```
user_CNA
```

Format

An object of class `data.frame` with 579 rows and 13 columns.

Author(s)

Karim Mezhoud <kmezhoud@gmail.com>

user_MetHM27

*Example of Methylation HM27 dataset***Description**

Example of Methylation HM27 dataset

Usage

```
user_MetHM27
```

Format

An object of class `data.frame` with 600 rows and 13 columns.

Author(s)

Karim Mezhoud <kmezhoud@gmail.com>

user_MetHM450

Example of Methylation HM450 dataset

Description

Example of Methylation HM450 dataset

Usage

```
user_MetHM450
```

Format

An object of class `data.frame` with 10 rows and 13 columns.

Author(s)

Karim Mezhoud <kmezhoud@gmail.com>

user_mRNA

Example of mRNA expression dataset

Description

Example of mRNA expression dataset

Usage

```
user_mRNA
```

Format

An object of class `data.frame` with 307 rows and 13 columns.

Author(s)

Karim Mezhoud <kmezhoud@gmail.com>

user_Mut	<i>Example of Mutation dataset</i>
----------	------------------------------------

Description

Example of Mutation dataset

Usage

```
user_Mut
```

Format

An object of class `data.frame` with 37 rows and 23 columns.

Author(s)

Karim Mezhoud <kmezhoud@gmail.com>

whichGeneList	<i>Verify which gene list is selected</i>
---------------	---

Description

Verify which gene list is selected

Usage

```
whichGeneList(geneListLabel)
```

Arguments

geneListLabel	The label of GeneList. There are three cases: "Genes" user gene list, "Reactome_GeneList" GeneList plus genes from reactomeFI "file name" from Examples
---------------	---

Value

Gene List label

Examples

```
How <- "runManually"
## Not run:
whichGeneList("102")

## End(Not run)
```

widgetThumbnail	<i>Capture html output widget as .png in R</i>
-----------------	--

Description

Capture html output widget as .png in R

Usage

```
widgetThumbnail(p, thumbName, width = 1024, height = 1024)
```

Arguments

p	is the html widget
thumbName	is the name of the new png file
width	1024
height	1024

Value

3 files .html, .js and .png

Examples

```
How <- "runManually"
## Not run:
# Load package
library(networkD3)
library(htmlwidgets)
# Create fake data
src <- c("A", "A", "A", "A", "B", "B", "C", "C", "D")
target <- c("B", "C", "D", "J", "E", "F", "G", "H", "I")
networkData <- data.frame(src, target)
# Plot
plot = simpleNetwork(networkData)
# Save html as png
widgetThumbnail(p = plot, thumbName = "plot", width = 1024, height = 1024)

## End(Not run)
```

Index

- * **datasets**
 - epiGenomics, [15](#)
 - user_CNA, [44](#)
 - user_MetHM27, [44](#)
 - user_MetHM450, [45](#)
 - user_mRNA, [45](#)
 - user_Mut, [46](#)
- * **package**
 - AnnotationFuncs, [5](#)
 - package (bioCancer), [10](#)
 - .dbEscapeString, [3](#)
 - .getTableName, [4](#), [22](#)
 - .pickRef, [4](#)
- AnnotationFuncs, [5](#)
- attriColorGene, [6](#)
- attriColorValue, [7](#)
- attriColorVector, [8](#)
- attriShape2Gene, [9](#)
- attriShape2Node, [9](#)
- bioCancer, [10](#)
- CGDS, [10](#)
- checkDimensions, [11](#)
- coffeewheel, [12](#)
- coffeewheelOutput, [12](#)
- displayTable, [13](#)
- Edges_Diseases_obj, [14](#)
- epiGenomics, [15](#)
- findPhantom, [15](#)
- getEvidenceCodes, [16](#), [32](#), [33](#)
- getFreqMutData, [16](#)
- getGenesClassification, [17](#)
- getList_Cases, [19](#)
- getList_GenProfs, [20](#)
- getListProfData, [18](#)
- getOrthologs, [5](#), [6](#), [20](#)
- getProfData, [22](#)
- getSequenced_SampleSize, [23](#)
- mapLists, [22](#), [24](#), [34](#)
- metabologram, [25](#)
- metabologramOutput, [26](#)
- Mutation_obj, [26](#)
- Node_df_FreqIn, [27](#)
- Node_Diseases_obj, [28](#)
- Node_obj_CNA_ProfData, [29](#)
- Node_obj_FreqIn, [29](#)
- Node_obj_Met_ProfData, [30](#)
- Node_obj_mRNA_Classifier, [31](#)
- pickG0, [16](#), [32](#), [42](#), [43](#)
- pickRefSeq, [4](#), [5](#), [33](#), [33](#), [43](#)
- removeNAs, [24](#), [34](#)
- renderCoffeewheel, [35](#)
- renderMetabologram, [36](#)
- reStrColorGene, [36](#)
- reStrDimension, [37](#)
- reStrDisease, [38](#)
- returnTextAreaInput, [39](#)
- Studies_obj, [40](#)
- switchButton, [40](#)
- test.CGDS, [41](#)
- translate, [5](#), [6](#), [21](#), [22](#), [32](#), [33](#), [41](#)
- UnifyRowNames, [43](#)
- user_CNA, [44](#)
- user_MetHM27, [44](#)
- user_MetHM450, [45](#)
- user_mRNA, [45](#)
- user_Mut, [46](#)
- whichGeneList, [46](#)
- widgetThumbnail, [47](#)