Package 'rcellminer'

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Type Package

Title rcellminer: Molecular Profiles, Drug Response, and Chemical Structures for the NCI-60 Cell Lines

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Description The NCI-60 cancer cell line panel has been used over the course of several decades as an anti-cancer drug screen. This panel was developed as part of the Developmental Therapeutics Program (DTP, http://dtp.nci.nih.gov/) of the U.S. National Cancer Institute (NCI). Thousands of compounds have been tested on the NCI-60, which have been extensively characterized by many platforms for gene and protein expression, copy number, mutation, and others (Reinhold, et al., 2012). The purpose of the CellMiner project (http://discover.nci.nih.gov/cellminer) has been to integrate data from multiple platforms used to analyze the NCI-60 and to provide a powerful suite of tools for exploration of NCI-60 data.

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`.onAttach` *Display citation message*

Description

Display citation message

Usage

```
.onAttach(libname, pkgname)
```

Arguments

libname	a character string giving the library directory where the package defining the namespace was found.
pkgname	a character string giving the name of the package.

.onLoad *Make sure that rcellminerData is loaded*

Description

Make sure that rcellminerData is loaded

Usage

```
.onLoad(libname, pkgname)
```

Arguments

libname	a character string giving the library directory where the package defining the namespace was found.
pkgname	a character string giving the name of the package.

---

cmVersion *CellMiner Version*

Description

CellMiner Version

Details

The version of CellMiner used

Author(s)

Vinodh Rajapakse <vinodh.rajapakse AT nih.gov>

References

http://discover.nci.nih.gov/cellminer

crossCors *Calculate cross-correlations with between rows of input matrices*

Description

Calculate cross-correlations with between rows of input matrices

Usage

```
crossCors(X, Y = NULL, method = "pearson")
```

Arguments

X	a matrix or data.frame
Y	a matrix or data.frame
method	a string specifying the type of correlation, chosen from pearson (default) or spearman.

Value

a list containing matrices of pairwise correlations and their p-values between rows of the input matrices or dataframes.

Author(s)

Sudhir Varma, NCI-LMP, with input checks, support for Spearman's correlation added by VNR.

Examples

```
drugActData <- exprs(getAct(rcellminerData::drugData))
crossCors(drugActData[c("94600"), ], drugActData[c("727625", "670655"), ])
crossCors(drugActData[c("94600"), ], drugActData[c("727625", "670655"), ], method="spearman")
```

crossCorsSpearman *Calculate Spearman's correlations with between rows of input matrices*

Description

Calculate Spearman's correlations with between rows of input matrices

Usage

```
crossCorsSpearman(X, Y = NULL)
```

Arguments

X	a matrix or data.frame
Y	a matrix or data.frame

Value

a list containing matrices of pairwise Spearman's correlations and their p-values between rows of the input matrices or dataframes.

Examples

```
## Not run:
crossCorsSpearman(drugActData[c("94600"), ], drugActData[c("727625", "670655"), ])

## End(Not run)
```

DrugData *Returns a DrugData object.*

Description

Returns a DrugData object.

Usage

```
DrugData(act, repeatAct, sampleData, ...)
```

Arguments

act	An eSet object containing drug activity data across a set of biological samples.
repeatAct	An eSet object containing repeat drug activity experiment data with respect to the same samples associated with act.
sampleData	A MIAxE object capturing sample and other data set information.
...	Other possible parameters.

Value

A DrugData object.

DrugData,eSet,eSet,MIAxE-method

Returns a DrugData object.

Description

Returns a DrugData object.

Usage

```
## S4 method for signature 'eSet,eSet,MIAxE'
DrugData(act, repeatAct, sampleData, ...)
```

Arguments

act	An eSet object containing drug activity data across a set of biological samples.
repeatAct	An eSet object containing repeat drug activity experiment data with respect to the same samples associated with act.
sampleData	A MIAxE object capturing sample and other data set information.
...	Other possible parameters.

Value

A DrugData object.

DrugData-class

An S4 class to represent drug activity and related data recorded for a set of biological samples.

Description

An S4 class to represent drug activity and related data recorded for a set of biological samples.

Arguments

...	Other possible parameters.

Slots

act An eSet object containing drug activity data across a set of biological samples.

repeatAct An eSet object containing repeat drug activity experiment data with respect to the same samples associated with act.

sampleData A MIAxE object capturing sample and other data set information.

drugDB *CellMiner Drug Response Values*

Description

CellMiner Drug Response Values

Details

A list containing response values and annotations:

- act Z-scores of the averaged negative log GI (growth inhibition) 50 values across repeats for the NCI-60; assay described here: http://dtp.nci.nih.gov/branches/btb/ivclsp.html
- annot
  - id Dataset identifier; NOTE: DO NOT use this column; the NSC is the primary drug identifier
  - nsc National Service Center identifier; the primary drug identifier
  - name Compound name
  - brand_name Brand name for the compound, if sold commericially
  - formula Compound chemical formula
  - testing_status Information on whether it is known if the compound is FDA approved or undergoing testing in clinical trials
  - source TODO
  - smiles Compound chemical structure as a SMILES string
  - weight Compound chemical weight in g/mol
  - mechanism Pharmacological mechanism of action
  - confidential_flag A flag to indicate if compound information is public
  - total_probes TODO
  - total_good_probes TODO
  - low_correlations TODO
  - failure_reason TODO
  - cas CAS Registry Number; NOTE: Due to data restrictions PubChem IDs are the preferred mapping ID to other datasets
  - pubchem_id PubChem ID

Author(s)

Vinodh Rajapakse <vinodh.rajapakse AT nih.gov>

References

http://discover.nci.nih.gov/cellminer/loadDownload.do

`Drug_MOA_Key` *A data frame with descriptive information for all compound mechanism of action (MOA) abbreviations used in CellMiner.*

Description

A data frame with descriptive information for all compound mechanism of action (MOA) abbreviations used in CellMiner.

`elNetMolDataNCI60` *NCI60 Molecular Data*

Description

Z-scores of values for a variety of assays conducted on the NCI-60 to facilitate comparison. Z-scores calculated over the 60 cell lines for the given feature.

Details

A list containing various assay values:

- cop Copy number values; Described in Pubmed ID: 24670534
- exp Expression values; Obtained from "RNA: 5 Platform Gene Transcript" http://discover.nci.nih.gov/cellminer/loadDownload.do; Missing values imputed using the R package "impute"
- mut Mutation values; Deleterious mutations obtained from TODO
- mir MicroRNA values; Obtained from "RNA: Agilent Human microRNA (V2)" http://discover.nci.nih.gov/cellminer/loadDownload.do
- pro Reverse protein lysate array values; Obtain from "Protein: Lysate Array" http://discover.nci.nih.gov/cellminer/loadDownload.do
- mda NCI-60 metadata.
  - CNV_GAIN Proportion of genome copy number gains; Described in Pubmed ID: 24670534
  - CNV_LOSS Proportion of genome copy number losses; Described in Pubmed ID: 24670534
  - CNV_TOTAL Sum of CNV_GAIN and CNV_LOSS
  - P53_BIN Binary TP53 profile curated by William Reinhold
  - MSI_OGAN_BIN Binary microsatellite instability (MSI) profile curated by Ogan Abaan using COSMIC data; Obtained from Supplementary Table 1 - Ogan Whole Exome Sequencing (WES) paper in Cancer Res.
  - EPITHELIAL Epithelial by tissue of origin - pattern extracted from the CellMiner cell line metadata http://discover.nci.nih.gov/cellminer/celllineMetadata.do
  - EPITHELIAL_KURT Kurt Kohn curation for epithelial-like cell lines based on molecular parameters described in Pubmed ID: 24940735

- DELETERIOUS Total deleterious variants from WES dataset; Fabricio Sousa curation
- MISSENSE Total missense variants from WES dataset; Fabricio Sousa curation
- SILENT Total silent variants from WES dataset; Fabricio Sousa curation
- TOTAL_AA Total amino acid changing variants from WES dataset; Fabricio Sousa curation
- CELL-CELL Cell-to-cell adhesion curated by William Reinhold
- DOUBLINGTIME The doubling time pattern was extracted from the CellMiner cell line metadata http://discover.nci.nih.gov/cellminer/celllineMetadata.do

Author(s)

Vinodh Rajapakse <vinodh.rajapakse AT nih.gov>

References

http://discover.nci.nih.gov/cellminer

`fingerprintList` *Molecular Fingerprint List*

Description

Molecular Fingerprint List

Author(s)

Augustin Luna <augustin AT mail.nih.gov>

References

http://discover.nci.nih.gov/cellminer

`getAct` *Returns an eSet object with drug activity data.*

Description

Returns an eSet object with drug activity data.

Usage

```
getAct(object, ...)
```

Arguments

object	Object for which drug activity data is to be returned.
...	Other possible parameters.

Value

An eSet object with drug activity data.

---

getAct,DrugData-method *Returns an eSet object with drug activity data.*

Description

Returns an eSet object with drug activity data.

Usage

```
## S4 method for signature 'DrugData'
getAct(object)
```

Arguments

object	DrugData object for which drug activity data is to be returned.

Value

An eSet object with drug activity data.

---

getActivityRangeStats *Returns a table of activity range statistics for a set of compounds.*

Description

Returns a table of activity range statistics for a set of compounds.

Usage

```
getActivityRangeStats(
  nscSet,
  concFormat = "NegLogGI50M",
  onlyCellMinerExps = TRUE
)
```

Arguments

nscSet	a character vector specifying NSC identifier(s) for compound(s) of interest.
concFormat	a string selected from "NegLogGI50M" or "IC50MicroM". "NegLogGI50M" specifies activities as the negative log of the 50 inhibitory concentration (molar). "IC50MicroM" specifies activities as the 50 inhibitory concentration (micromolar).
onlyCellMinerExps	a logical value indicating whether to only return experimental data included in CellMiner (default=TRUE).

Value

a table of activity range statistics for a set of compounds.

Examples

```
nscSet <- c("609699", "740")
getActivityRangeStats(nscSet)
getActivityRangeStats(nscSet, concFormat="IC50MicroM")
```

---

getAllFeatureData *Returns a list of feature data matrices.*

Description

Returns a list of feature data matrices.

Usage

```
getAllFeatureData(object, ...)
```

Arguments

object	Object for which a list of feature data matrices is to be returned.
...	Other possible parameters.

Value

A list of feature data matrices.

getAllFeatureData,MolData-method *Returns a list of feature data matrices.*

Description

Returns a list of feature data matrices.

Usage

```
## S4 method for signature 'MolData'
getAllFeatureData(object)
```

Arguments

object	MolData object for which a list of feature data matrices is to be returned.

Value

A list of feature data matrices.

getBinaryMutationData *Compute a binary gene mutation data matrix from SNP and other mutation event-level data.*

Description

Compute a binary gene mutation data matrix from SNP and other mutation event-level data.

Usage

```
getBinaryMutationData(
  mutInfo,
  mutData,
  maxVariantFreq = 0.2,
  maxNormalPopulationFreq = 0.005,
  maxSiftScore = 0.05,
  minPolyPhenScore = 0.85
)
```

Arguments

mutInfo	A data frame with the following named columns: Gene, the name of the gene associated with the mutation event; probe.ids, a unique identifier specifying the mutation event; SNP_1000_genome, the frequency of the mutation event in SNP 1000; ESP5400, the frequency of the mutation event in ESP5400; SNP_type, the type of mutation event, chosen from "MISSENSE", "FRAMESHIFT", "NON-FRAMESHIFT", "NONSENSE", "SPLICING"; SIFT_score, the SIFT score; Polyphen_score, the POLYPHEN score. Rownames of mutInfo should be set to probe.ids, i.e., the unique mutation event specifier.
mutData	A matrix with event level mutation information, with SNPs, etc. along rows and samples along columns. Rownames of mutData should exactly match those of mutInfo. The i-th row of mutInfo should thus give detailed information for the mutation event with data specified in the i-th row of mutData.
maxVariantFreq	The maximum proportion of mutant samples (used to exclude frequently occuring events); default value = 0.2.
maxNormalPopulationFreq	The maximum freqency of a mutation in the normal population (used to exclude likely germline variants); default value = 0.005.
maxSiftScore	The maximum accepted SIFT score (used to exclude presumed non-deleterious mutations); default value = 0.05.
minPolyPhenScore	The minimum accepted POLYPHEN score (used to exclude presumed non-deleterious mutations); default value = 0.85.

Value

A binary gene mutation matrix, with genes along rows, samples along columns, and 1s indicating deleterious mutations.

---

getColumnQuantiles *Calculate quantile for the columns in a matrix*

Description

Calculate quantile for the columns in a matrix

Usage

```
getColumnQuantiles(X, prob, naRm = FALSE, onlyNonzeroVals = FALSE)
```

Arguments

X	the matrix
prob	a numeric probablity
naRm	a boolean, whether to remove NAs
onlyNonzeroVals	a boolean, whether to only include non-zero values

Value

a vector of quantiles

Examples

```
getColumnQuantiles(matrix(1:25, nrow=5), prob = 0.5)
```

`getDrugActivityData` *Returns a matrix containing activity (-logGI50) data for a set of compounds.*

Description

Returns a matrix containing activity (-logGI50) data for a set of compounds.

Usage

```
getDrugActivityData(nscSet, onlyCellMinerExps = TRUE)
```

Arguments

`nscSet`	A string specifying the NSC identifiers for the compounds.
`onlyCellMinerExps`	A logical value indicating whether to compute results using only experimental data included in CellMiner (default=TRUE).

Value

a matrix with NCI-60 average (over experiments) -logGI50 activity data; compound activity profiles are along rows.

Examples

```
nscSet <- c("141540", "123127") # Etoposide, Doxorubicin.
actData <- getDrugActivityData(nscSet)
```

getDrugActivityRange *Returns a vector of log activity range values for set of compounds.*

Description

Returns a vector of log activity range values for set of compounds.

Usage

```
getDrugActivityRange(nscSet, computeIQR = FALSE)
```

Arguments

nscSet	a character vector specifying NSC identifier(s) for compound(s) of interest.
computeIQR	logical value indicated whether inter-quartile range is to be computed; otherwise absolute range is computed (default=FALSE).

Value

a numeric vector of NCI-60 log activity (-logGI50) range values indexed by the identifiers in nscSet.

Examples

```
nscSet <- c("609699", "740")
getDrugActivityRange(nscSet)
```

getDrugActivityRepeatData *Returns a matrix containing repeat activity experiment data for a compound.*

Description

Returns a matrix containing repeat activity experiment data for a compound.

Usage

```
getDrugActivityRepeatData(
  nscStr,
  concFormat = "NegLogGI50M",
  onlyCellMinerExps = TRUE
)
```

Arguments

nscStr	a string specifying the NSC identifier for the compound.
concFormat	a string selected from "NegLogGI50M" or "IC50MicroM". "NegLogGI50M" specifies activities as the negative log of the 50 inhibitory concentration (molar). "IC50MicroM" specifies activities as the 50 growth inhibitory concentration (micromolar).
onlyCellMinerExps	a logical value indicating whether to only return experimental data included in CellMiner (default=TRUE).

Value

a matrix with activity data from each experiment associated with a compound organized along the rows.

Examples

```
nscStr <- "609699"
actData <- getDrugActivityRepeatData(nscStr, concFormat='NegLogGI50M')
actData <- getDrugActivityRepeatData(nscStr, concFormat='IC50MicroM')
```

---

getDrugMoaList *Get a list of applicable MOA strings for a drug.*

Description

Get a list of applicable MOA strings for a drug.

Usage

```
getDrugMoaList(nsc, moaToCompoundListMap = NULL)
```

Arguments

nsc	An NSC string.
moaToCompoundListMap	A named list of character vectors, with each name indicating an MOA class, and its corresponding character vector specifying MOA-associated drugs. If unspecified, this is constructed based on MOA information provided by CellMiner.

Details

LINK TO MOAs?

Value

A character vector giving all MOA classes for the drug.

Examples

```
getDrugMoaList("754365")
```

`getDrugName` *Get the drug names for a set of NSC identifiers.*

Description

Get the drug names for a set of NSC identifiers.

Usage

```
getDrugName(nscSet)
```

Arguments

`nscSet`	A character vector of NSC strings

Value

A named character vector indicating the compound names for each NSC in nscSet (with an empty string returned if no such information is available, and an NA returned if the NSC is not included in the CellMiner database).

Examples

```
nscSet <- c("609699", "94600")
getDrugName(nscSet)
```

`getESetList` *Returns a list of eSet objects.*

Description

Returns a list of eSet objects.

Usage

```
getESetList(object, ...)
```

Arguments

`object`	Object for which a list of eSets is to be returned.
`...`	Other possible parameters.

Value

A list of eSet objects.

`getESetList,MolData-method` *Returns a list of eSet objects.*

Description

Returns a list of eSet objects.

Usage

```
## S4 method for signature 'MolData'
getESetList(object)
```

Arguments

`object`	MolData object for which a list of eSet objects is to be returned.

Value

A list of eSet objects.

`getFeatureAnnot` *Returns a list of data frames with feature information.*

Description

Returns a list of data frames with feature information.

Usage

```
getFeatureAnnot(object, ...)
```

Arguments

`object`	Object for which feature data is to be returned.
`...`	Other possible parameters.

Value

A list of data frames with feature information.

`getFeatureAnnot,DrugData-method`
Returns a list of data frames with feature information.

Description

Returns a list of data frames with feature information.

Usage

```
## S4 method for signature 'DrugData'
getFeatureAnnot(object)
```

Arguments

`object`	DrugData object for which feature data is to be returned.

Value

A named list of data frames with feature information for drugs and drug repeat experiments.

`getFeatureAnnot,MolData-method`
Returns a list of data frames with feature information.

Description

Returns a list of data frames with feature information.

Usage

```
## S4 method for signature 'MolData'
getFeatureAnnot(object)
```

Arguments

`object`	MolData object for which feature data is to be returned.

Value

A named list of data frames with feature information for available molecular data types.

`getFeatureDataFromMatList` *Extract from a list of matrices the data associated with a set of features.*

Description

Extract from a list of matrices the data associated with a set of features.

Usage

```
getFeatureDataFromMatList(
  featureSet,
  dataMatList,
  excludeMissingFeatures = TRUE
)
```

Arguments

`featureSet`	a character vector of feature names.
`dataMatList`	a list of matrices with feature data organized along the rows, and feature names accessible via rownames(dataMatList).
`excludeMissingFeatures`	a logical value indicating whether features whose data cannot be found in any matrices in dataMatList should be excluded in the output. (default=TRUE).

Value

a single matrix containing data for all features in featureSet.

Examples

```
featureSet <- c("expSLFN11", "mutSLX4")
molDataMats <- getMolDataMatrices()
featureData <- getFeatureDataFromMatList(featureSet, molDataMats)
```

`getMedSenLineActivity` *Returns a vector of median sensitive cell line activity (-logGI50) values for a set of compounds.*

Description

Returns a vector of median sensitive cell line activity (-logGI50) values for a set of compounds.

Usage

```
getMedSenLineActivity(
  idSet,
  senLineActZThreshold = 0.5,
  onlyCellMinerExps = TRUE,
  dataSource = "NCI60"
)
```

Arguments

idSet	a character vector specifying identifier(s) for compound(s) of interest.
senLineActZThreshold	the minimum activity z-score for a sensitive cell line (default=0.5).
onlyCellMinerExps	a logical value indicating whether to base results strictly on experimental data included in CellMiner (default=TRUE).
dataSource	character string indicating data source (default="NCI60"). Currently only "NCI60" is supported.

Value

a numeric vector of median sensitive cell line activity (-logGI50) values indexed by the identifiers in idSet.

Examples

```
idSet <- c("609699", "740")
getMedSenLineActivity(idSet)
```

---

getMinDrugActivityRepeatCor

Returns a table indicating, for each compound in a specified set, the least significant correlation and associated p-value between its replicate experiments.

Description

Returns a table indicating, for each compound in a specified set, the least significant correlation and associated p-value between its replicate experiments.

Usage

```
getMinDrugActivityRepeatCor(nscSet)
```

Arguments

nscSet	a character vector specifying NSC identifier(s) for compound(s) of interest.

Value

a dataframe containing the following columns: NSC, cor, pval

Examples

```
nscSet <- c("123528", "339316")
repExpCorTab <- getMinDrugActivityRepeatCor(nscSet)
```

---

getMoaStr *Get MOA string*

Description

Get MOA string

Usage

```
getMoaStr(nscStr)
```

Arguments

nscStr	an NSC string

Details

LINK TO MOAs?

Value

a comma-delimited string with MOA

Examples

```
getMoaStr("94600")
getMoaStr(c("94600", "609699"))
```

getMoaToCompounds *Get a named list mapping MOA classes to associated compound sets.*

Description

Get a named list mapping MOA classes to associated compound sets.

Usage

```
getMoaToCompounds()
```

Value

a named list mapping MOA classes to associated compound sets (each represented as a character vector).

Examples

```
moaToCompounds <- getMoaToCompounds()
```

getMolDataMatrices *Returns a list of molecular data type matrices, with rownames in each matrix prefixed with a data type abbreviation.*

Description

Returns a list of molecular data type matrices, with rownames in each matrix prefixed with a data type abbreviation.

Usage

```
getMolDataMatrices(molDataMats = NULL)
```

Arguments

molDataMats	A named list of molecular data type matrices with feature data specified along the rows, and feature names indicated in the row names.

Value

a list containing molecular data type matrices, with rownames in each matrix prefixed with a data type abbreviation, e.g., 'exp' for mRNA expression, etc. The matrix-specific data type abbreviations are derived from the names of molDataMats.

Examples

```
molDataMats <- getMolDataMatrices()
```

`getMolDataType` *Get the molecular data type prefixes for a set of features.*

Description

Get the molecular data type prefixes for a set of features.

Usage

```
getMolDataType(features, prefixLen = 3)
```

Arguments

`features`	A vector of features.
`prefixLen`	The length of the molecular data type prefix.

Value

A character vector of molecular data type prefixes.

#' @examples getMolDataType(c("expTP53", "copMDM2", "mutCHEK2", "mutBRAF"))

`getNumDrugActivityRepeats`

Returns a vector indicating the number of drug activity repeat experiments with available data for each member of a set of compounds.

Description

Returns a vector indicating the number of drug activity repeat experiments with available data for each member of a set of compounds.

Usage

```
getNumDrugActivityRepeats(nscSet, onlyCellMinerExps = TRUE)
```

Arguments

`nscSet`	a character vector specifying NSC identifier(s) for compound(s) of interest.
`onlyCellMinerExps`	a logical value indicating whether to return only the number of experiments with data included in CellMiner (default=TRUE).

Value

a numeric vector, indexed by nscSet, indicating the number of drug activity repeat experiments for each one of its compounds.

Examples

```
nscSet <- c("1", "17", "89", "609699")
getNumDrugActivityRepeats(nscSet)
```

---

getNumMissingLines *Returns a vector indicating the number of NCI-60 cell lines with missing activity data for set of compounds.*

Description

Returns a vector indicating the number of NCI-60 cell lines with missing activity data for set of compounds.

Usage

```
getNumMissingLines(nscSet)
```

Arguments

nscSet	a character vector specifying NSC identifier(s) for compound(s) of interest.

Value

a numeric vector indicating the number of NCI-60 cell lines with missing activity data, indexed by the identifiers in nscSet.

Examples

```
nscSet <- c("1", "17", "89", "609699")
getNumMissingLines(nscSet)
```

`getRepeatAct` *Returns an eSet object with drug repeat activity experiment data.*

Description

Returns an eSet object with drug repeat activity experiment data.

Usage

```
getRepeatAct(object, ...)
```

Arguments

`object`	Object for which drug repeat activity experiment data is to be returned.
`...`	Other possible parameters.

Value

An eSet object with drug repeat activity experiment data.

`getRepeatAct,DrugData-method`
Returns an eSet object with drug repeat activity experiment data.

Description

Returns an eSet object with drug repeat activity experiment data.

Usage

```
## S4 method for signature 'DrugData'
getRepeatAct(object)
```

Arguments

`object`	DrugData object for which drug repeat activity experiment data is to be returned.

Value

An eSet object with drug repeat activity experiment data.

getRsd — *Computes the relative standard deviation values with respect to the columns of a matrix or data.frame.*

Description

Computes the relative standard deviation values with respect to the columns of a matrix or data.frame.

Usage

```
getRsd(dat, onlyReturnMedian = TRUE)
```

Arguments

dat	a matrix or data.frame with numeric values.
onlyReturnMedian	a logical value indicating whether only the median column RSD value should be returned (vs. all RSD values).

Value

median RSD value over the data set columns or all RSD values, depending on value of onlyReturnMedian (default=TRUE).

Examples

```
A <- matrix(rnorm(10*60), nrow=10)
getRsd(A)
getRsd(A, onlyReturnMedian=FALSE)
```

getSampleData — *Returns a data frame with sample information.*

Description

Returns a data frame with sample information.

Usage

```
getSampleData(object, ...)
```

Arguments

object	Object for which sample data is to be returned.
...	Other possible parameters.

Value

A data frame with sample information.

`getSampleData,DrugData-method`
Returns a data frame with sample information.

Description

Returns a data frame with sample information.

Usage

```
## S4 method for signature 'DrugData'
getSampleData(object)
```

Arguments

`object`	DrugData object for which sample data is to be returned.

Value

A data frame with sample information.

`getSampleData,MolData-method`
Returns a data frame with sample information.

Description

Returns a data frame with sample information.

Usage

```
## S4 method for signature 'MolData'
getSampleData(object)
```

Arguments

`object`	MolData object for which sample data is to be returned.

Value

A data frame with sample information.

getSmiles *Get the SMILES strings for a set of NSC identifiers.*

Description

Get the SMILES strings for a set of NSC identifiers.

Usage

```
getSmiles(nscSet)
```

Arguments

nscSet	A character vector of NSC strings

Value

A named character vector indicating the SMILES string for each NSC in nscSet (or NA if no structural information is available).

Examples

```
nscSet <- c("609699", "94600")
getSmiles(nscSet)
```

hasMoa *Check if NSC has Mechanism of Action (MOA) Annotation*

Description

Check if NSC has Mechanism of Action (MOA) Annotation

Usage

```
hasMoa(nsc)
```

Arguments

nsc	a string, an NSC identifier

Value

a boolean whether the NSC has an MOA

Examples

```
hasMoa("754365")
```

initialize,DrugData-method
Returns a DrugData object.

Description

Returns a DrugData object.

Usage

```
## S4 method for signature 'DrugData'
initialize(.Object, act, repeatAct, sampleData)
```

Arguments

.Object	An object: see "new()" documentation in "methods" package.
act	An eSet object containing drug activity data across a set of biological samples.
repeatAct	An eSet object containing repeat drug activity experiment data with respect to the same samples associated with act.
sampleData	A MIAxE object capturing sample and other data set information.

Value

A DrugData object.

Note

Seems to be required for definition of a constructor.

initialize,MolData-method
Returns a MolData object.

Description

Returns a MolData object.

Usage

```
## S4 method for signature 'MolData'
initialize(.Object, eSetList, sampleData)
```

Arguments

.Object	An object: see "new()" documentation in "methods" package.
eSetList	A list of eSet objects for a common set of samples.
sampleData	A MIAxE object capturing sample and other data set information.

Value

A MolData object.

---

isPublic *Check if an NSC ID is public*

Description

Check if an NSC ID is public

Usage

```
isPublic(nscs)
```

Arguments

nscs	a vector of NSC string IDs

Value

a vector of boolean values of whether each NSC is public

Examples

```
isPublic("-1")
isPublic(c("-1", "609699"))
```

loadCellminerPlotInfo *Returns data to plot CellMiner plots*

Description

Returns data to plot CellMiner plots

Usage

```
loadCellminerPlotInfo(returnDf = FALSE)
```

Arguments

returnDf	a boolean if a data.frame with all information (default: FALSE)

Value

a vector of colors as strings or a data.frame with dataType, label, xMin, xMax

Examples

```
loadCellminerPlotInfo()
```

loadNciColorSet *Returns a 60-element color set that matches the color set used on http://discover.nci.nih.gov/*

Description

Returns a 60-element color set that matches the color set used on http://discover.nci.nih.gov/

Usage

```
loadNciColorSet(returnDf = FALSE)
```

Arguments

returnDf	a boolean if a data.frame with tissue names and abbreviations should be returned (default: FALSE)

Value

a vector of colors as strings or a data.frame with tissues, tissue abbreviations, cell line abbreviations and colors

Examples

```
loadNciColorSet()
```

`MolData` *Returns a MolData object.*

Description

Returns a MolData object.

Usage

```
MolData(eSetList, sampleData, ...)
```

Arguments

`eSetList`	A list of eSet objects for a common set of samples.
`sampleData`	A MIAxE object capturing sample and other data set information.
`...`	Other possible parameters.

Value

A MolData object.

`MolData,list,MIAxE-method`
Returns a MolData object.

Description

Returns a MolData object.

Usage

```
## S4 method for signature 'list,MIAxE'
MolData(eSetList, sampleData, ...)
```

Arguments

`eSetList`	A list of eSet objects for a common set of samples.
`sampleData`	A MIAxE object capturing sample and other data set information.
`...`	Other possible parameters.

Value

A MolData object.

`MolData-class` *An S4 class to represent molecular data recorded for a set of biological samples.*

Description

An S4 class to represent molecular data recorded for a set of biological samples.

Arguments

`...`	Other possible parameters.

Slots

`eSetList` A list of eSet objects for a common set of samples.

`sampleData` A MIAxE object capturing sample and other data set information.

`parCorPatternComparison` *Compare an input pattern against a set of patterns, excluding the predictive effect of a fixed pattern or set of patterns.*

Description

Compare an input pattern against a set of patterns, excluding the predictive effect of a fixed pattern or set of patterns.

Usage

```
parCorPatternComparison(x, Y, Z, updateProgress = NULL)
```

Arguments

`x`	An N element input pattern specified as either a vector or a 1 x N matrix or data frame.
`Y`	An N element pattern specified as a vector for comparison with the input pattern x or a k x N matrix with k patterns for comparison with the input pattern x specified along the rows, with rownames set appropriately.
`Z`	An N element pattern specified as a vector or a k x N matrix of patterns specified along the rows. These are the patterns whose effect (with respect to a linear model) is to be excluded when comparing x with Y or each row entry of Y. Note that for the partial correlation to be value, the pattern(s) in Z should not overlap with those in x or Y.
`updateProgress`	A optional function to be invoked with each computed partial correlation to indicate progress.

Value

A data frame with pattern comparison results (ordered by PARCOR): NAME: Name of entry in Y being compared. PARCOR: Partial correlation between x and the entry in Y with respect to Z. PVAL: p-value.

Examples

```
x <- exprs(getAct(rcellminerData::drugData))["609699", ]
Y <- rcellminer::getAllFeatureData(rcellminerData::molData)[["exp"]][1:100, ]
Z <- rcellminer::getAllFeatureData(rcellminerData::molData)[["exp"]][c("SLFN11", "JAG1"), ]
results <- parCorPatternComparison(x, Y, Z)
Y <- rcellminer::getAllFeatureData(rcellminerData::molData)[["exp"]][1, , drop=TRUE]
Z <- rcellminer::getAllFeatureData(rcellminerData::molData)[["exp"]]["SLFN11", , drop=TRUE]
results <- parCorPatternComparison(x, Y, Z)
```

---

patternComparison *Compare an input pattern against a set of patterns.*

Description

Compare an input pattern against a set of patterns.

Usage

```
patternComparison(pattern, profileMatrixList, method = "pearson")
```

Arguments

pattern	An N element input pattern specified as either a named vector or an 1 x N matrix or data frame. Names (or column names) must match the column names of each element of profileMatrixList.
profileMatrixList	A single matrix (or data frame) or a list of matrices (or data frames). Each matrix (data frame) must be k x N - that is the k patterns for comparison with the input pattern must be specified along the rows, with rownames set appropriately.
method	a string specifying the type of correlation, chosen from pearson (default) or spearman.

Value

A data frame with pattern comparison results. Specifically, if M is the total number patterns in profileMatrixList elements, an M x 2 matrix is returned with sorted Pearson's correlations in the first column and corresponding p-values in the second column. Comparison pattern names are indicated in the row names.

Examples

```
drugAct <- exprs(getAct(rcellminerData::drugData))
molDataMats <- getMolDataMatrices()[c("exp", "mut")]
molDataMats <- lapply(molDataMats, function(X) X[1:10, ])
pcResults <- patternComparison(drugAct["609699", ], molDataMats)
pcResults <- patternComparison(drugAct["609699", ], molDataMats, method="spearman")
pcResults <- patternComparison(drugAct["609699", ], molDataMats$exp, method="spearman")
```

`plotCellMiner` *Description: Produces CellMiner-like plots in R*

Description

Description: Produces CellMiner-like plots in R

Usage

```
plotCellMiner(
  drugAct,
  molData,
  plots,
  nsc = NULL,
  gene = NULL,
  features = NULL,
  sub = NULL,
  xLimits = NULL,
  xLabel = NULL,
  extraPlot = NULL,
  verbose = FALSE
)
```

Arguments

`drugAct`	a matrix of drug activity values (cell lines as columns, drug entries as rows)
`molData`	a list of matricies a molecular
`plots`	a vector of characters denoting the plots to include and the order (e.g. c("mut", "drug", "cop"). Currently, supported entries mutations (mut), drug activities (drug), copy number variations (cop)
`nsc`	a string NSC ID that will be plotted when a "drug" entry appears in the plots vector
`gene`	a string HUGO gene symbol for which the "mut", "cop", or "exp" plots will be produced if in plots vector

features	a vector of strings that provide the full IDs for elements to be plotted (e.g. mutCDK4 for CDK4 mutations). This overwrites the nsc and gene parameters, but is needed in advanced plots that involve data that involves one-to-many relationships (e.g. many entries for a given gene in the exome data) and a gene symbol is ambiguous.
sub	a vector of strings with sub-titles for each plot
xLimits	a 2 number vector with the the minimum and maximum X-axis values (default: -3,3 for Z-scores, 0,1 for binary entries)
xLabel	a string for the default X-axis label
extraPlot	a list containing title, label, and values (numeric vector of length 60); only one extra plot can be included
verbose	a boolean to show debugging information

Value

None

Author(s)

Augustin Luna <augustin AT mail.nih.gov>

Examples

```
drugAct <- exprs(getAct(rcellminerData::drugData))
molData <- getMolDataMatrices()
plots <- c("mut", "drug", "cop", "xai", "pro")
plotCellMiner(drugAct, molData, plots=plots, nsc="94600", gene="CDK4", verbose=FALSE)

plots <- c("mut", "xai", "cop", "cop", "cop", "cop")
plotCellMiner(drugAct, molData, plots=plots, nsc="94600", gene=c("CDK4", "TP53",
  "BRAF", "GAPDH"), verbose=FALSE)

plotCellMiner(drugAct, molData, plots=NULL, nsc=NULL, features=c("mutCDK4",
  "xaiCDK4", "exochr1:101704532_G_T", "mdaIS_P53_MUT", "mirhsa-miR-22", "proTP53_26_GBL00064"),
  verbose=FALSE)
```

---

plotCellMiner2D *Make a simple 2d plot using two variables with ggplot2*

Description

Make a simple 2d plot using two variables with ggplot2

Usage

```
plotCellMiner2D(
  df,
  xCol = "x",
  yCol = "y",
  xLabel = xCol,
  yLabel = yCol,
  title = NULL,
  colorPalette = NULL,
  classCol = NULL,
  tooltipCol = NULL,
  showLegend = FALSE,
  showTrendLine = TRUE,
  showTitle = TRUE,
  singleColor = "#0000FF",
  alpha = 1,
  numberColPrefix = "X",
  xLimVal = NULL,
  yLimVal = NULL,
  pointSize = 3
)
```

Arguments

df	a data.frame with at least two columns
xCol	the name of the column in df with the "x" data. See Note
yCol	the name of the column in df with the "y" data. See Note
xLabel	the x plot label
yLabel	the y plot label
title	the plot title, if null the correlation will appear (DEFAULT: NULL)
colorPalette	a named vector with the names classes and value colors (DEFAULT: NULL)
classCol	the name of the column with the classes. Values in column of df must be a factor (DEFAULT: NULL)
tooltipCol	the name of the column used for tooltips when plotted with plotly
showLegend	boolean, whether to show the legend (DEFAULT: FALSE)
showTrendLine	boolean, whether to show the trendline
showTitle	boolean, whether to show the title
singleColor	a color to be used for all points when a color palette is not provided (DEFAULT: blue)
alpha	value from 0-1, where 0 indicates transparent points (DEFAULT: 1, not transparent)
numberColPrefix	a prefix to add to column names that start with a number that causes issues with ggplot (DEFAULT: X)

xLimVal	a two entry vector (min, max) to set the x-axis
yLimVal	a two entry vector (min, max) to set the y-axis
pointSize	size of points on plot (DEFAULT: 3)

Value

a ggplot object

Note

TROUBLESHOOTING NOTES: 1) Avoid ":" in colnames

Uses ggplot aes_string() which uses parse() to turn your text expression into a proper R symbol that can be resolved within the data.frame. Avoid numbers and spaces in

Author(s)

Augustin Luna <augustin AT mail.nih.gov>

Examples

```
## Not run:
# Load data
nci60DrugActZ <- exprs(getAct(rcellminerData::drugData))
nci60GeneExpZ <- getAllFeatureData(rcellminerData::molData)[["exp"]]
# Load colors
colorTab <- loadNciColorSet(returnDf=TRUE)
tissueColorTab <- unique(colorTab[, c("tissues", "colors")])
# Merge data
df <- as.data.frame(t(rbind(nci60DrugActZ["94600",], nci60GeneExpZ["SLFN11",])))
colnames(df) <- c("y", "x")
df <- cbind(df, colorTab)
# Plot data
plotCellMiner2D(df, xCol="x", yCol="y", xLabel="SLFN11", yLabel="94600")
plotCellMiner2D(df, xCol="x", yCol="y", showTrendLine = FALSE, showTitle = FALSE)
plotCellMiner2D(df, xCol="x", yCol="y", showTrendLine = FALSE, showLegend = FALSE)

## End(Not run)
```

---

plotDrugActivityRepeats

Plot NCI-60 drug activity profiles for repeat experiments.

Description

Plot NCI-60 drug activity profiles for repeat experiments.

Usage

```
plotDrugActivityRepeats(
  nscStr,
  useZScore = FALSE,
  maxRepNum = 5,
  pdfFilename = NULL,
  pdfWidth = 12,
  pdfHeight = 6
)
```

Arguments

nscStr	a string specifying the NSC identifier for a compound.
useZScore	a boolean specifying whether to plot z-transformed data (as opposed to -logGI50 values).
maxRepNum	an integer specifying the maximum number of repeat experiments to plot.
pdfFilename	name of a PDF output
pdfWidth	with of the PDF (default: 12)
pdfHeight	with of the PDF (default: 6)

Value

NONE

Examples

```
plotDrugActivityRepeats("609699")
plotDrugActivityRepeats("609699", useZScore=TRUE, maxRepNum=3)
```

---

plotDrugSets *Produces a barplot of the average values for a set of NSCs with a error bar (one standard deviation)*

Description

Produces a barplot of the average values for a set of NSCs with a error bar (one standard deviation)

Usage

```
plotDrugSets(
  drugAct,
  drugs,
  mainLabel = "",
  pdfFilename = NULL,
  statistic = "mean"
)
```

Arguments

drugAct	a matrix of drug activity values (cell lines as columns, drug entries as rows)
drugs	a vector of NSC IDs whose values will be averaged by cell line
mainLabel	a main label for the plot
pdfFilename	a string file name for a PDF plot, no file output will be produced if this is not provided
statistic	a string, either 'mean' or 'median' (Default: mean)

Value

no values are returned

Examples

```
drugAct <- exprs(getAct(rcellminerData::drugData))
drugs <- rownames(drugAct)[1:8]
plotDrugSets(drugAct, drugs, "Test")
```

---

removeMolDataType *Remove molecular data type prefixes from features.*

Description

Remove molecular data type prefixes from features.

Usage

```
removeMolDataType(features, prefixLen = 3)
```

Arguments

features	A vector of features.
prefixLen	The length of the molecular data type prefix.

Details

This function is primarily used to remove prefixes from elastic net features.

Value

A named vector of features without molecular data type prefixes.

Examples

```
removeMolDataType(c("expTP53", "copMDM2", "mutCHEK2", "mutBRAF"))
```

restrictFeatureMat *Restricts a feature matrix to only include features associated with a specified gene set.*

Description

Restricts a feature matrix to only include features associated with a specified gene set.

Usage

```
restrictFeatureMat(geneSet, featureMat, prefixSet = c("cop", "exp", "mut"))
```

Arguments

geneSet	a character vector of gene names.
featureMat	a matrix or data frame with feature vectors along rows and feature names specified in rownames(featureMat).
prefixSet	a set of feature name prefixes to be prepended to each element of geneSet to obtain a collection of geneSet-associated features.

Value

a matrix containing the features in the intersection of rownames(featureMat) and the set of geneSet-derived features (obtained by prepending each element of prefixSet to each gene in geneSet).

#' @examples X <- matrix(1:25, nrow=5) rownames(X) <- c("expA", "expB", "copC", "mutC", "expD") restrictFeatureMat(geneSet = c("B", "C"), X)

rowCors *Row-wise correlations*

Description

Correlation between ith row of x and ith row of y for all i

Usage

```
rowCors(X, Y)
```

Arguments

X	a matrix
Y	a matrix

Value

a list of two vectors: cor (correlation values) and pval (correlation p-values)

Author(s)

Sudhir Varma, NCI-LMP

Examples

```
a <- matrix(runif(100), nrow=10, ncol=10)
b <- matrix(runif(100), nrow=10, ncol=10)
c <- rowCors(a, b)
```

`searchForNscs` *Search for NSCs*

Description

Search for NSCs

Usage

```
searchForNscs(pattern)
```

Arguments

`pattern`	a search pattern. This string will be treated as a regular expression with the case ignored.

Details

Use this function with caution. Not all compounds have names and compounds can have many synonyms not included in CellMiner.

Value

A vector of matching NSCs

Examples

```
searchForNscs("nib$")
```

`selectCorrelatedRows` *Select features that are correlated with a given feature (or one or more features from a set of features).*

Description

Select features that are correlated with a given feature (or one or more features from a set of features).

Usage

```
selectCorrelatedRows(Y, X, corThreshold = 0.1, useAbsCor = TRUE)
```

Arguments

`Y`	a vector or matrix; rows from X will be correlated with Y if Y is a vector or with rows of Y, if Y is a matrix.
`X`	a matrix of values that will be compared with Y (vector) or rows of Y (matrix)
`corThreshold`	the minimum correlation threshold for the row to be returned
`useAbsCor`	a logical value indicating whether absolute correlations should be used (default=TRUE).

Value

a matrix of rows of X correlated with Y (if Y is a vector) or correlated with at least one row of Y if Y is a matrix or data frame.

Examples

```
vec <- runif(10)
mat <- matrix(runif(100), 10, 10)
selectCorrelatedRows(vec, mat)
```

`selectCorrelatedRowsFromMatrices`

Select features that are correlated with a given feature (or one or more features from a set of features), merging results from multiple candidate feature matrices.

Description

Select features that are correlated with a given feature (or one or more features from a set of features), merging results from multiple candidate feature matrices.

Usage

```
selectCorrelatedRowsFromMatrices(
  Y,
  XList,
  corThreshold = 0.1,
  useAbsCor = TRUE
)
```

Arguments

Y	a vector or matrix; rows from each matrix element of X will be correlated with Y if Y is a vector or with rows of Y, if Y is a matrix.
XList	a list of matrices whose rows will be correlated with Y (vector) or rows of Y (matrix). The rownames in each matrix element of XList must be specified to values that are unique with respect to the total set of rownames (as derived from all matrices in XList).
corThreshold	the minimum correlation threshold for the row to be returned
useAbsCor	a logical value indicating whether absolute correlations should be used (default=TRUE).

Value

a matrix formed from rows of matrices in XList that are correlated with Y (if Y is a vector) or correlated with at least one row of Y if Y is a matrix or data frame.

Examples

```
vec <- runif(10)
names(vec) <- 1:10
matList <- list(X1 = matrix(runif(100), 10, 10), X2 = matrix(runif(100), 10, 10))
rownames(matList$X1) <- paste0("X1_row_", 1:10)
colnames(matList$X1) <- paste0("X1_col_", 1:10)
rownames(matList$X2) <- paste0("X2_row_", 1:10)
colnames(matList$X2) <- paste0("X2_col_", 1:10)
selectCorrelatedRowsFromMatrices(vec, matList)
```

[[,MolData-method *Returns an indexed eSet object from a MolData object eSet list.*

Description

Returns an indexed eSet object from a MolData object eSet list.

Usage

```
## S4 method for signature 'MolData'
x[[i]]
```

Arguments

x	A MolData object.
i	Index or named item in MolData object eSet list.

Value

An indexed eSet object from a MolData object eSet list.

[[<-,MolData-method *Assigns an eSet object to a specified position in a MolData object eSet list.*

Description

Assigns an eSet object to a specified position in a MolData object eSet list.

Usage

```
## S4 replacement method for signature 'MolData'
x[[i]] <- value
```

Arguments

x	A MolData object.
i	Index or named item in MolData object eSet list.
value	An eSet object to be assigned.

Value

An eSet object to a specified position in a MolData object eSet list.

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