Package 'gDRutils'

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Description This package contains utility functions used throughout the gDR platform to fit data, manipulate data, and convert and validate data structures. This package also has the necessary default constants for gDR platform. Many of the functions are utilized by the gDRcore package.

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Author Bartosz Czech [aut] (ORCID: <https://orcid.org/0000-0002-9908-3007>),
Arkadiusz Gladki [cre, aut] (ORCID:
<https://orcid.org/0000-0002-7059-6378>),
Aleksander Chlebowski [aut],
Marc Hafner [aut] (ORCID: <https://orcid.org/0000-0003-1337-7598>),
Pawel Piatkowski [aut],
Dariusz Scigocki [aut],
Janina Smola [aut],
Sergiu Mocanu [aut],
Allison Vuong [aut]

Maintainer Arkadiusz Gladki <gladki.arkadiusz@gmail.com>

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`gDRutils-package` *gDRutils: A package with helper functions for processing drug response data*

Description

This package contains utility functions used throughout the gDR platform to fit data, manipulate data, and convert and validate data structures. This package also has the necessary default constants for gDR platform. Many of the functions are utilized by the gDRcore package.

Value

package help page

Note

To learn more about functions start with `help(package = "gDRutils")`

Author(s)

Maintainer: Arkadiusz Gladki <gladki.arkadiusz@gmail.com> (ORCID)

Authors:

- Bartosz Czech (ORCID)
- Aleksander Chlebowski
- Marc Hafner (ORCID)
- Pawel Piatkowski
- Dariusz Scigocki
- Janina Smola
- Sergiu Mocanu
- Allison Vuong

See Also

Useful links:

- https://github.com/gdrplatform/gDRutils
- https://gdrplatform.github.io/gDRutils/
- Report bugs at https://github.com/gdrplatform/gDRutils/issues

`.convert_mae_summary_to_json` *Create JSON document with MAE summary*

Description

Create JSON document with MAE summary, currently only experiment names

Usage

```
.convert_mae_summary_to_json(mae)
```

Arguments

`mae`	MultiAssayExperiment object.

Value

String representation of a JSON document.

`.convert_norm_specific_metrics` *This function change raw names of metric from long format table into more descriptive names in the wide format table. It works for metrics:* `colnames(get_header("metrics_names"))`

Description

This function change raw names of metric from long format table into more descriptive names in the wide format table. It works for metrics: `colnames(get_header("metrics_names"))`

Usage

```
.convert_norm_specific_metrics(x, normalization_type)
```

Value

object with more descriptive names

`.prep_cd_conc_cap_dict` *Prepare dict with min and max concentration for codilution*

Description

Prepare dict with min and max concentration for codilution

Usage

```
.prep_cd_conc_cap_dict(
  conc_assay_dt,
  group_cols = as.character(get_env_identifiers(c("drug_name", "drug_name2",
    "cellline_name"), simplify = FALSE))
)
```

Arguments

`conc_assay_dt`	assay data in data.table format with Concentration data
`group_cols`	charvec with grouping column names

Value

`data.table` with max and min concentration for codilution

`.set_invalid_fit_params` *Set fit parameters for an invalid fit.*

Description

Set fit parameters for an invalid fit.

Usage

```
.set_invalid_fit_params(out, norm_values)
```

Arguments

`out`	Named list of fit parameters.
`norm_values`	Numeric vector used to estimate an `xc50` value.

Value

Modified named list of fit parameters.

Examples

```
.set_invalid_fit_params(list(), norm_values = rep(0.3, 6))
```

`.snap_conc_to_model` *Snap a concentration to the nearest available model concentration*

Description

Finds the value in a vector of available concentrations that is closest (on a log scale) to a user-specified concentration. This is an internal helper function.

Usage

```
.snap_conc_to_model(user_conc, available_concs)
```

Arguments

`user_conc`	A single numeric value for the desired concentration.
`available_concs`	A numeric vector of concentrations for which a model exists.

Value

A single numeric value from 'available_concs'.

`.standardize_conc` *Standardize concentration values.*

Description

Standardize concentration values.

Usage

```
.standardize_conc(conc)
```

Arguments

`conc`	numeric vector of the concentrations

Details

If no `conc` are passed, `NULL` is returned.

Value

vector of standardized concentrations

Examples

```
concs <- 10 ^ (seq(-1, 1, 0.9))
.standardize_conc(concs)
```

`addClass` *add arbitrary S3 class to an object*

Description

Modify and object's `class` attribute.

Usage

```
addClass(x, newClass)
```

Arguments

`x`	an object
`newClass`	character string; class to be added

Details

This is a simple convenience function that an item to the `class` attribute of an object so that it can be dispatched to a proper S3 method. This is purely for code clarity, so that individual methods do not clutter the definitions of higher order functions.

Value

The same object with an added S3 class.

Examples

```
addClass(data.table::data.table(), "someClass")
```

aggregate_assay *Aggregate a* BumpyMatrix *assay by a given aggregation function.*

Description

Aggregation can only be performed on nested variables.

Usage

```
aggregate_assay(asy, by, FUN)
```

Arguments

asy	A BumpyMatrix object.
by	Character vector of the nested fields to aggregate by.
FUN	A function to use to aggregate the data.

Value

A BumpyMatrix object aggregated by FUN.

Examples

```
mae <- get_synthetic_data("finalMAE_small.qs2")
se <- mae[[1]]
assay <- SummarizedExperiment::assay(se)
aggregate_assay(assay, FUN = mean, by = c("Barcode"))
```

apply_bumpy_function *Apply a function to every element of a bumpy matrix.*

Description

Apply a user-specified function to every element of a bumpy matrix.

Usage

```
apply_bumpy_function(
  se,
  FUN,
  req_assay_name,
  out_assay_name,
  parallelize = FALSE,
  ...
)
```

Arguments

se	A SummarizedExperiment object with bumpy matrices.
FUN	A function that will be applied to each element of the matrix in assay req_assay_name. Output of the function must return a data.table.
req_assay_name	String of the assay name in the se that the FUN will act on.
out_assay_name	String of the assay name that will contain the results of the applied function.
parallelize	Logical indicating whether or not to parallelize the computation.
...	Additional args to be passed to teh FUN.

Value

The original se object with a new assay, out_assay_name.

Examples

```
mae <- get_synthetic_data("finalMAE_small.qs2")
se <- mae[[1]]
FUN <- function(x) {
 data.table::data.table(Concentration = x$Concentration, CorrectedReadout = x$CorrectedReadout)
}
apply_bumpy_function(
  se,
  FUN = FUN,
  req_assay_name = "RawTreated",
  out_assay_name = "CorrectedReadout"
)
```

---

assert_choices *assert choices*

Description

assert choices

Usage

```
assert_choices(x, choices, ...)
```

Arguments

x	charvec expected subset
choices	charvec reference set
...	Additional arguments to pass to checkmate::test_choice

Value

NULL

Examples

```
assert_choices("x", c("x","y"))
```

---

average_biological_replicates_dt *Average biological replicates on the data table side.*

Description

Average biological replicates on the data table side.

Usage

```
average_biological_replicates_dt(
  dt,
  var,
  prettified = FALSE,
  fixed = TRUE,
  geometric_average_fields = get_header("metric_average_fields")$geometric_mean,
  fit_type_average_fields = get_header("metric_average_fields")$fit_type,
  blacklisted_fields = get_header("metric_average_fields")$blacklisted,
  add_sd = FALSE
)
```

Arguments

dt	data.table with Metric data
var	String representing additional metadata of replicates
prettified	Flag indicating if the provided identifiers in the dt are prettified
fixed	Flag indicating whether to add a fix for -Inf in the geometric mean.
geometric_average_fields	Character vector of column names in dt to take the geometric average of.
fit_type_average_fields	Character vector of column names in dt that should be treated as a column with fit type data
blacklisted_fields	Character vector of column names in dt that should be skipped in averaging
add_sd	Flag indicating whether to add standard deviation and count columns.

Value

data.table without replicates

Examples

```
dt <- data.table::data.table(a = c(seq_len(10), 1),
b = c(rep("drugA", 10), rep("drugB", 1)))
average_biological_replicates_dt(dt, var = "a")
```

`average_pvalues` *Average p-values using Fisher's method Combines a vector of p-values into a single representative p-value. It implements Fisher's method, where the test statistic is calculated as*

$$X_2k\hat{}2 = -2 \sum _i = 1\hat{}k \ln(p_i)$$

. This statistic follows a chi-squared distribution with 2k degrees of freedom (where k is the number of p-values), from which the combined p-value is derived.

Description

Average p-values using Fisher's method Combines a vector of p-values into a single representative p-value. It implements Fisher's method, where the test statistic is calculated as

$$X^2_{2k} = -2 \sum_{i=1}^{k} \ln(p_i)$$

. This statistic follows a chi-squared distribution with 2k degrees of freedom (where k is the number of p-values), from which the combined p-value is derived.

Usage

```
average_pvalues(p_values)
```

Arguments

`p_values`	A numeric vector of p-values. Values are expected to be between 0 and 1. The function assumes at least one non-NA value is provided.

Value

A single, combined p-value as a numeric value.

calc_sd *Calculate Standard Deviation or Return Zero*

Description

This function calculates the standard deviation of a numeric vector. If the vector has a length of 1 and it is numeric, it returns 0.

Usage

```
calc_sd(x)
```

Arguments

x	A numeric vector.

Value

The standard deviation of the vector if its length is greater than 1 or it is not numeric, otherwise 0.

Examples

```
calc_sd(c(1, 2, 3, 4, 5)) # Should return the standard deviation
calc_sd(c(1)) # Should return 0
calc_sd(numeric(0)) # Should return NA
calc_sd(c("a", "b", "c")) # Should return NA
```

capVals *Cap metric values*

Description

Convenience function to apply caps to outlying metric values.

Usage

```
capVals(x)
```

Arguments

x	`data.table` containing growth metrics extracted from a `SummarizedExperiment`

Details

The following metrics are capped at the respective values:

- E max: 0 - 1.1
- GR max: -1 - 1.1
- RV AOC within set range: over -0.1
- GR AOC within set range: over of -0.1
- GR50: 1e-4 to 30
- IC50: 1e-4 to 30
- EC50: 1e-4 to 30 (change 0 to NA beforehand)

Value

A data table with capped values.

See Also

convert_se_assay_to_dt, oob

Examples

```
dt <- data.table::data.table(
  `E Max` = c(-0.1, 0, 0.5, 1.2),
  `GR Max` = c(-1.1, -1, 0.5, 1.2),
  `RV AOC within set range` = c(-0.2, -0.1, 0, 3),
  `GR AOC within set range` = c(-0.2, -0.1, 0, 3),
  `GR50` = c(0, 1e-7, 10, 34),
  `IC50` = c(0, 1e-7, 10, 34),
  `EC50` = c(0, 1e-7, 10, 34),
  check.names = FALSE
)
dt
dt1 <- capVals(dt)
dt1
```

---

cap_assay_infinities *Cap infinity values (Inf, -Inf) in the assay data*

Description

Cap infinity values (Inf, -Inf) in the assay data

Usage

```
cap_assay_infinities(
  conc_assay_dt,
  assay_dt,
  experiment_name,
  col = "xc50",
  capping_fold = 5,
  additional_group_cols = NULL
)
```

Arguments

conc_assay_dt	assay data in data.table format with Concentration data
assay_dt	assay data in data.table format with infinity values to be capped
experiment_name	string with the name of the experiment
col	string with column name to be capped in assay_dt ("xc50" by default)
capping_fold	number for min and max concentration values final formulas are min / capping_fold and max * capping_fold
additional_group_cols	character vector of column names used to identify unique observations • for single-agent experiment additional to the combination of DrugName and CellLineName • for combination experiment additional to the combination of DrugName, DrugName_2 and CellLineName

Value

data.table without -Inf / Inf values

Examples

```
# single-agent data
sdata <- get_synthetic_data("finalMAE_small.qs2")
smetrics_data <- convert_se_assay_to_dt(sdata[[get_supported_experiments("sa")]], "Metrics")
saveraged_data <- convert_se_assay_to_dt(sdata[[get_supported_experiments("sa")]], "Averaged")
smetrics_data_capped <- cap_assay_infinities(saveraged_data,
                                             smetrics_data,
                                             experiment_name = "single-agent")

# combination data
cdata <- get_synthetic_data("finalMAE_combo_matrix_small.qs2")
scaveraged_data <- convert_se_assay_to_dt(cdata[[get_supported_experiments("combo")]], "Averaged")
scmetrics_data <- convert_se_assay_to_dt(cdata[[get_supported_experiments("combo")]], "Metrics")
scmetrics_data_capped <- cap_assay_infinities(scaveraged_data,
                                              scmetrics_data,
                                              experiment_name = "combination")
```

cap_xc50 *Cap XC50 value.*

Description

Set IC50/GR50 value to `Inf` or `-Inf` based on upper and lower limits.

Usage

```
cap_xc50(xc50, max_conc, min_conc = NA, capping_fold = 5)
```

Arguments

`xc50`	Numeric value of the IC50/GR50 to cap.
`max_conc`	Numeric value of the highest concentration in a dose series used to calculate the `xc50`.
`min_conc`	Numeric value of the lowest concentration in a dose series used to calculate the `xc50`. If `NA` (default), using `max_conc/1e5` instead.
`capping_fold`	Integer value of the fold number to use for capping. Defaults to `5`.

Details

Note: `xc50` and `max_conc` should share the same units. Ideally, the `lower_cap` should be based on the lowest tested concentration. However, since we don't record that, it is set 5 orders of magnitude below the highest dose.

Value

Capped IC50/GR50 value.

Examples

```
cap_xc50(xc50 = 1, max_conc = 2)
cap_xc50(xc50 = 2, max_conc = 5, min_conc = 1)
cap_xc50(xc50 = 26, max_conc = 5, capping_fold = 5)
```

convert_colData_to_json *Convert colData to JSON*

Description

Convert colData to JSON format for elasticsearch indexing.

Usage

```
convert_colData_to_json(
  cdata,
  identifiers,
 req_cols = c("cellline", "cellline_name", "cellline_tissue", "cellline_ref_div_time")
)
```

Arguments

cdata	data.table of colData.
identifiers	charvec with identifiers
req_cols	charvec required columns

Details

Standardizes the cdata to common schema fields and tidies formatting to be condusive to joining with other JSON responses.

Value

JSON string capturing the cdata.

Examples

```
cdata <- data.table::data.table(
  mycellline = letters,
  mycelllinename = letters,
  mycelllinetissue = letters,
  cellline_ref_div_time = "cellline_ref_div_time")
identifiers <- list(cellline = "mycellline",
                    cellline_name = "mycelllinename",
                    cellline_ref_div_time = "cellline_ref_div_time",
                    cellline_tissue = "mycelllinetissue")
convert_colData_to_json(cdata, identifiers)
```

convert_combo_data_to_dt *convert combo assays from SummarizedExperiments to the list of data.tables*

Description

convert combo assays from SummarizedExperiments to the list of data.tables

Usage

```
convert_combo_data_to_dt(
  se,
  c_assays = get_combo_assay_names(),
  normalization_type = c("RV", "GR"),
  prettify = TRUE
)
```

Arguments

se	SummarizedExperiment object with dose-response data
c_assays	charvec of combo assays to be used
normalization_type	charvec of normalization_types expected in the data
prettify	boolean flag indicating whether or not to prettify the colnames of the returned data

Value

list of data.table(s) with combo data

Author(s)

Arkadiusz Gładki <arkadiusz.gladki@contractors.roche.com>

Examples

```
mae <- get_synthetic_data("finalMAE_combo_matrix_small.qs2")
convert_combo_data_to_dt(mae[[1]])
```

`convert_combo_field_to_assay` *get combo assay names based on the field name*

Description

get combo assay names based on the field name

Usage

```
convert_combo_field_to_assay(field)
```

Arguments

`field`	String containing name of the field for which the assay name should be returned

Value

charvec

Examples

```
convert_combo_field_to_assay("hsa_score")
```

`convert_mae_assay_to_dt` *Convert a MultiAssayExperiment assay to a long data.table*

Description

Convert an assay within a SummarizedExperiment object in a MultiAssayExperiment to a long data.table.

Usage

```
convert_mae_assay_to_dt(
  mae,
  assay_name,
  experiment_name = NULL,
  include_metadata = TRUE,
  retain_nested_rownames = FALSE,
  wide_structure = FALSE,
  drop_masked = TRUE,
  merge_additional_variables = FALSE
)
```

Arguments

mae	A MultiAssayExperiment object holding experiments with raw and/or processed dose-response data in its assays.
assay_name	String of name of the assay to transform within an experiment of the mae.
experiment_name	String of name of the experiment in mae whose assay_name should be converted. Defaults to NULL to indicate to convert assay in all experiments into one data.table object.
include_metadata	Boolean indicating whether or not to include rowData() and colData() in the returned data.table. Defaults to TRUE.
retain_nested_rownames	Boolean indicating whether or not to retain the rownames nested within a BumpyMatrix assay. Defaults to FALSE. If the assay_name is not of the BumpyMatrix class, this argument's value is ignored. If TRUE, the resulting column in the data.table will be named as "<assay_name>_rownames".
wide_structure	Boolean indicating whether or not to transform data.table into wide format. wide_structure = TRUE requires retain_nested_rownames = TRUE however that will be validated in convert_se_assay_to_dt function
drop_masked	Boolean indicating whether to drop masked values; TRUE by default.
merge_additional_variables	Boolean indicating whether to merge additional variables identified by get_additional_variables into the DrugName column. Defaults to FALSE.

Details

NOTE: to extract information about 'Control' data, simply call the function with the name of the assay holding data on controls.

Value

data.table representation of the data in assay_name.

Author(s)

Bartosz Czech bartosz.czech@contractors.roche.com

See Also

flatten convert_se_assay_to_dt

Examples

```
mae <- get_synthetic_data("finalMAE_small.qs2")
convert_mae_assay_to_dt(mae, "Metrics")
```

`convert_mae_to_json` *Create JSON document.*

Description

Convert a MultiAssayExperiment object to a JSON document.

Usage

```
convert_mae_to_json(mae, with_experiments = TRUE)
```

Arguments

`mae`	SummarizedExperiment object.
`with_experiments`	logical convert experiment metadata as well?

Value

String representation of a JSON document.

Examples

```
mae <- get_synthetic_data("finalMAE_small.qs2")
convert_mae_to_json(mae)
convert_mae_to_json(mae, with_experiments = FALSE)
```

`convert_metadata_to_json` *Convert experiment metadata to JSON format for elasticsearch indexing.*

Description

Convert experiment metadata to JSON format for elasticsearch indexing.

Usage

```
convert_metadata_to_json(se)
```

Arguments

`se`	SummarizedExperiment object.

Value

JSON string capturing experiment metadata.

Examples

```
md <- list(title = "my awesome experiment",
  description = "description of experiment",
  sources = list(list(name = "GeneData_Screener", id = "QCS-12345")))
se <- SummarizedExperiment::SummarizedExperiment(metadata = md)
convert_metadata_to_json(se)
```

`convert_rowData_to_json` *Convert rowData to JSON*

Description

Convert rowData to JSON format for elasticsearch indexing.

Usage

```
convert_rowData_to_json(
  rdata,
  identifiers,
  req_cols = c("drug", "drug_name", "drug_moa", "duration")
)
```

Arguments

`rdata`	data.table of `rowData`.
`identifiers`	charvec with identifiers
`req_cols`	charvec required columns

Details

Standardizes the `rdata` to common schema fields and tidies formatting to be condusive to joining with other JSON responses.

Value

JSON string capturing the `rdata`.

Examples

```
rdata <- data.table::data.table(
  mydrug = letters,
  mydrugname = letters,
  mydrugmoa = letters,
  Duration = 1)
identifiers <- list(drug = "mydrug", drug_name = "mydrugname", drug_moa = "mydrugmoa",
duration = "Duration")
convert_rowData_to_json(rdata, identifiers)
```

`convert_se_assay_to_custom_dt` *Convert a SummarizedExperiment assay to a long data.table and conduct some post processing steps*

Description

Convert an assay within a SummarizedExperiment object to a long data.table. Then conduct some post processing steps.

Usage

```
convert_se_assay_to_custom_dt(
  se,
  assay_name,
  output_table = NULL,
  cap_values = FALSE
)
```

Arguments

`se`	A SummarizedExperiment object holding raw and/or processed dose-response data in its assays.
`assay_name`	String of name of the assay to transform within the `se`.
`output_table`	String of type name of the output data.table.
`cap_values`	Logical indicating whether to apply capping (via `capVals`) for "Metrics" output. Default is FALSE.

Details

Current strategy is per-assay specific.

1. combo assays: conversion to data.table only (with `wide_structure` = FALSE)
2. 'Metrics' assay can be converted to three types of outputs:

- Metrics_initial (conversion to data.table only, with `wide_structure` = FALSE)

- Metrics_raw: same as Metrics_initial followed by:
  - fix for 'EC50' and 'Metrics_rownames'
  - flatten
  - prettifying and dropping excess variables
- Metrics (same as Metrics_raw + cap_values if `cap_values = TRUE`)

1. 'Normalization' and 'Averaged' assay:

- conversion to data.table (with `wide_structure` = TRUE)
- prettifying and dropping excess variables

NOTE: to extract information about 'Control' data, simply call the function with the name of the assay holding data on controls. To extract the reference data in the same format as 'Averaged' use `convert_se_ref_assay_to_dt`.

Value

data.table representation of the data in `assay_name` with added information from `colData`.

See Also

convert_se_assay_to_dt

Examples

```
mae <- get_synthetic_data("finalMAE_small.qs2")
se <- mae[[1]]
convert_se_assay_to_custom_dt(se, "Metrics")
convert_se_assay_to_custom_dt(se, "Metrics", output_table = "Metrics_raw")
convert_se_assay_to_custom_dt(se, "Metrics", output_table = "Metrics_initial")
convert_se_assay_to_custom_dt(se, "Averaged")
convert_se_assay_to_custom_dt(se, "Metrics", cap_values = TRUE)
```

`convert_se_assay_to_dt` *Convert a SummarizedExperiment assay to a long data.table*

Description

Convert an assay within a SummarizedExperiment object to a long data.table.

Usage

```
convert_se_assay_to_dt(
  se,
  assay_name,
  include_metadata = TRUE,
  retain_nested_rownames = FALSE,
  wide_structure = FALSE,
  unify_metadata = FALSE,
  drop_masked = TRUE,
  merge_additional_variables = FALSE
)
```

Arguments

se	A SummarizedExperiment object holding raw and/or processed dose-response data in its assays.
assay_name	String of name of the assay to transform within the se.
include_metadata	Boolean indicating whether or not to include rowData(se) and colData(se) in the returned data.table. Defaults to TRUE.
retain_nested_rownames	Boolean indicating whether or not to retain the rownames nested within a BumpyMatrix assay. Defaults to FALSE. If the assay_name is not of the BumpyMatrix class, this argument's value is ignored. If TRUE, the resulting column in the data.table will be named as "<assay_name>_rownames".
wide_structure	Boolean indicating whether or not to transform data.table into wide format. wide_structure = TRUE requires retain_nested_rownames = TRUE.
unify_metadata	Boolean indicating whether to unify DrugName and CellLineName in cases where DrugNames and CellLineNames are shared by more than one Gnumber and/or clid within the experiment.
drop_masked	Boolean indicating whether to drop masked values; TRUE by default.
merge_additional_variables	Boolean indicating whether to merge additional variables identified by get_additional_variables into the DrugName column. Defaults to FALSE.

Details

NOTE: to extract information about 'Control' data, simply call the function with the name of the assay holding data on controls. To extract the reference data in to same format as 'Averaged' use convert_se_ref_assay_to_dt.

Value

data.table representation of the data in assay_name.

See Also

flatten

Examples

```
mae <- get_synthetic_data("finalMAE_small.qs2")
se <- mae[[1]]
convert_se_assay_to_dt(se, "Metrics")
```

---

convert_se_to_json *Convert a SummarizedExperiment object to a JSON document.*

Description

Convert a SummarizedExperiment object to a JSON document.

Usage

```
convert_se_to_json(se)
```

Arguments

se	SummarizedExperiment object.

Value

String representation of a JSON document.

Examples

```
md <- list(title = "my awesome experiment",
  description = "description of experiment",
  source = list(name = "GeneData_Screener", id = "QCS-12345"))
rdata <- data.table::data.table(
 mydrug = letters,
  mydrugname = letters,
  mydrugmoa = letters,
  Duration = 1)
cdata <- data.table::data.table(mycellline = letters, mycelllinename = letters,
 mycelllinetissue = letters, cellline_ref_div_time = letters)
identifiers <- list(cellline = "mycellline",
                    cellline_name = "mycelllinename",
                    cellline_tissue = "mycelllinetissue",
                    cellline_ref_div_time = "cellline_ref_div_time",
                    drug = "mydrug",
                    drug_name = "mydrugname",
                    drug_moa = "mydrugmoa",
                    duration = "Duration")
se <- SummarizedExperiment::SummarizedExperiment(rowData = rdata,
                                                 colData = cdata)
se <- set_SE_experiment_metadata(se, md)
se <- set_SE_identifiers(se, identifiers)
```

```
convert_se_to_json(se)
```

`define_matrix_grid_positions` *Define matrix grid positions*

Description

Define matrix grid positions

Usage

```
define_matrix_grid_positions(conc1, conc2)
```

Arguments

conc1	drug_1 concentration
conc2	drug_2 concentration

Details

drug_1 is diluted along the rows as the y-axis and drug_2 is diluted along the columns and will be the x-axis.

Value

list with axis grid positions

Examples

```
cl_name <- "cellline_BC"
drug1_name <- "drug_001"
drug2_name <- "drug_026"

se <- get_synthetic_data("combo_matrix_small")[["combination"]]
dt_average <- convert_se_assay_to_dt(se, "Averaged")[normalization_type == "GR"]

ls_axes <- define_matrix_grid_positions(
   dt_average[["Concentration"]], dt_average[["Concentration_2"]])
```

demote_fields — *Demote a metadata field in the* rowData *or* colData *of a* SummarizedExperiment *object to a nested field of a* BumpyMatrix *assay.*

Description

Demote a metadata field in the rowData or colData of a SummarizedExperiment object to a nested field of a BumpyMatrix assay.

Usage

```
demote_fields(se, fields)
```

Arguments

se	A SummarizedExperiment object.
fields	Character vector of metadata fields to demote as nested columns.

Details

Revert this operation using promote_fields.

Value

A SummarizedExperiment object with new dimensions resulting from demoting given fields to nested columns.

See Also

promote_fields

Examples

```
mae <- get_synthetic_data("finalMAE_small.qs2")
se <- mae[[1]]
se <- promote_fields(se, "ReadoutValue", 2)
demote_fields(se, "ReadoutValue")
```

df_to_bm_assay *df_to_bm_assay*

Description

Convert data.table with dose-response data into a BumpyMatrix assay.

Usage

```
df_to_bm_assay(data, discard_keys = NULL)
```

Arguments

data	data.table with drug-response data
discard_keys	a vector of keys that should be discarded

Details

The 'assay' is simply a BumpyMatrix object with rownames being the treatment ids, colnames being the ids of the cell lines and values with dose-response data for given cell lines under given conditions.

Value

BumpyMatrix object

Examples

```
df_to_bm_assay(data.table::data.table(Gnumber = 2, clid = "A"))
```

extend_normalization_type_name *extend abbreviated normalization type*

Description

extend abbreviated normalization type

Usage

```
extend_normalization_type_name(x)
```

Arguments

x	string with normalization type

Value

string

Examples

```
extend_normalization_type_name("GR")
```

`fit_curves` *Fit curves*

Description

Fit GR and RV curves from a data.table.

Usage

```
fit_curves(
  df_,
  series_identifiers,
  e_0 = 1,
  GR_0 = 1,
  n_point_cutoff = 4,
  range_conc = c(0.005, 5),
  force_fit = FALSE,
  pcutoff = 0.05,
  cap = 0.1,
  normalization_type = c("GR", "RV")
)
```

Arguments

`df_`	data.table containing data to fit. See details.
`series_identifiers`	character vector of the column names in `data.table` whose combination represents a unique series for which to fit curves.
`e_0`	numeric value representing the `x_0` value for the RV curve. Defaults to `1`.
`GR_0`	numeric value representing the `x_0` value for the GR curve. Defaults to `1`.
`n_point_cutoff`	integer of how many points should be considered the minimum required to try to fit a curve. Defaults to `4`.
`range_conc`	numeric vector of length 2 indicating the lower and upper concentration ranges. Defaults to `c(5e-3, 5)`. See details.
`force_fit`	boolean indicating whether or not to force a constant fit. Defaults to `FALSE`.
`pcutoff`	numeric of pvalue significance threshold above or equal to which to use a constant fit. Defaults to `0.05`.

cap numeric value capping norm_values to stay below (x_0 + cap). Defaults to 0.1.

normalization_type
character vector of types of curves to fit. Defaults to c("GR", "RV").

Details

The df_ expects the following columns:

- RelativeViability normalized relative viability values (if normalization_type includes "RV")
- GRvalue normalized GR values (if normalization_type includes "GR")

The range_conc is used to calculate the x_AOC_range statistic. The purpose of this statistic is to enable comparison across different experiments with slightly different concentration ranges.

Value

data.table of fit parameters as specified by the normalization_type.

Examples

```
df_ <- data.table::data.table(Concentration = c(0.001, 0.00316227766016838,
0.01, 0.0316227766016838),
x_std = c(0.1, 0.1, 0.1, 0.1), normalization_types = c("RV", "RV", "RV", "RV"),
x = c(0.9999964000144, 0.999964001439942, 0.999640143942423, 0.996414342629482))

fit_curves(df_, "Concentration", normalization_type = "RV")
```

---

flatten *Flatten a table*

Description

Flatten a stacked table into a wide format.

Usage

```
flatten(tbl, groups, wide_cols, sep = "_")
```

Arguments

tbl	table to flatten.
groups	character vector of column names representing uniquifying groups in expansion.
wide_cols	character vector of column names to flatten.
sep	string representing separator between wide_cols columns, used in column renaming. Defaults to "_".

Details

flattened columns will be named with original column names prefixed by `wide_cols` columns, concatenated together and separated by `sep`.

A common use case for this function is when a flattened version of the `"Metrics"` assay is desired.

Value

table of flattened data as defined by `wide_cols`.

See Also

convert_se_assay_to_dt

Examples

```
n <- 4
m <- 5
grid <- expand.grid(normalization_type = c("GR", "RV"),
  source = c("GDS", "GDR"))
repgrid <- data.table::rbindlist(rep(list(grid), m))
repgrid$wide <- seq(m * n)
repgrid$id <- rep(LETTERS[1:m], each = n)

groups <- colnames(grid)
wide_cols <- c("wide")

flatten(repgrid, groups = groups, wide_cols = wide_cols)
```

---

gen_synthetic_data *gen_synthetic_data*

Description

Function for generating local synthetic data used for unit tests in modules

Usage

```
gen_synthetic_data(m = 1, n = 5)
```

Arguments

`m`	number of drugs
`n`	number of records

Value

list with drugs, cell_lines, raw_data and assay_data

Examples

```
gen_synthetic_data()
```

`geometric_mean` *Geometric mean*

Description

Auxiliary function for calculating geometric mean with possibility to handle -Inf

Usage

```
geometric_mean(x, fixed = TRUE, maxlog10Concentration = 1)
```

Arguments

`x`	numeric vector
`fixed`	flag should be add fix for -Inf
`maxlog10Concentration`	numeric value needed to calculate minimal value

Value

numeric vector

Examples

```
geometric_mean(c(2, 8))
```

`get_additional_variables` *Identify and return additional variables in list of dt*

Description

Identify and return additional variables in list of dt

Usage

```
get_additional_variables(dt_list, unique = FALSE, prettified = FALSE)
```

Arguments

dt_list	list of data.table or data.table containing additional variables
unique	logical flag indicating if all variables should be returned or only those containing more than one unique value
prettified	Flag indicating if the provided identifiers in the dt are prettified

Value

vector of variable names with additional variables

Examples

```
dt <- data.table::data.table(
  Gnumber = seq_len(10),
  Concentration = runif(10),
  Ligand = c(rep(0.5, 5), rep(0, 5))
)
get_additional_variables(dt)
```

---

get_assay_dt_duplicated_rows *Helper function to find duplicated rows in assay data*

Description

Helper function to find duplicated rows in assay data

Usage

```
get_assay_dt_duplicated_rows(dt, output = "index")
```

Arguments

dt	data.table
output	string with the output format to be returned

Value

integer vector or data.table with duplicated rows

Examples

```
sdata <- get_synthetic_data("finalMAE_small.qs2")
smetrics_data <- convert_se_assay_to_dt(sdata[[1]], "Metrics")
get_assay_dt_duplicated_rows(smetrics_data, output = "data")
get_assay_dt_duplicated_rows(smetrics_data)
```

`get_assay_names` *get assay names of the given se/dataset fetch the data from the se if provided as metadata use predefined values from* `get_env_assay_names` *otherwise*

Description

get assay names of the given se/dataset fetch the data from the se if provided as metadata use predefined values from `get_env_assay_names` otherwise

Usage

```
get_assay_names(se = NULL, ...)
```

Arguments

`se`	SummarizedExperiment or NULL
`...`	Additional arguments to pass to `get_env_assay_names`.

Value

charvec

Author(s)

Arkadiusz Gładki <arkadiusz.gladki@contractors.roche.com>

Examples

```
get_assay_names()
```

`get_assay_req_uniq_cols` *get columns in the assay data required to have unique data*

Description

get columns in the assay data required to have unique (non-duplicated) data

Usage

```
get_assay_req_uniq_cols(dt)
```

Arguments

`dt`	data.table with assay data

Value

charvec with columns required to have unique data

Examples

```
sdata <- get_synthetic_data("finalMAE_small.qs2")
smetrics_data <- convert_se_assay_to_dt(sdata[[1]], "Metrics")
get_assay_req_uniq_cols(smetrics_data)
```

---

get_combo_assay_names *get names of combo assays*

Description

get names of combo assays

Usage

```
get_combo_assay_names(se = NULL, ...)
```

Arguments

se	SummarizedExperiment or NULL
...	Additional arguments to pass to get_assay_names.

Value

charvec of combo assay names.

Author(s)

Arkadiusz Gładki <arkadiusz.gladki@contractors.roche.com>

Examples

```
get_combo_assay_names()
```

get_combo_base_assay_names *get names of combo base assays*

Description

get names of combo base assays

Usage

```
get_combo_base_assay_names(se = NULL, ...)
```

Arguments

se	SummarizedExperiment or NULL
...	Additional arguments to pass to get_combo_assay_names.

Value

charvec

Author(s)

Arkadiusz Gładki <arkadiusz.gladki@contractors.roche.com>

Examples

```
get_combo_base_assay_names()
```

get_combo_excess_field_names *get names of combo excess fields*

Description

get names of combo excess fields

Usage

```
get_combo_excess_field_names()
```

Value

charvec

Examples

```
get_combo_excess_field_names()
```

`get_combo_score_assay_names` *get names of combo score assays*

Description

get names of combo score assays

Usage

```
get_combo_score_assay_names(se = NULL, ...)
```

Arguments

se	SummarizedExperiment or NULL
...	Additional arguments to pass to `get_combo_assay_names`.

Value

charvec

Author(s)

Arkadiusz Gładki <arkadiusz.gladki@contractors.roche.com>

Examples

```
get_combo_score_assay_names()
```

`get_combo_score_field_names` *get names of combo score fields*

Description

get names of combo score fields

Usage

```
get_combo_score_field_names()
```

Value

charvec

Examples

```
get_combo_score_assay_names()
```

---

get_default_identifiers *Get gDR default identifiers required for downstream analysis.*

Description

Get gDR default identifiers required for downstream analysis.

Usage

```
get_default_identifiers()
```

Value

charvec

Examples

```
get_default_identifiers()
```

---

get_duplicated_rows *Helper function to find duplicated rows*

Description

Helper function to find duplicated rows

Usage

```
get_duplicated_rows(x, col_names = NULL, output = "index")
```

Arguments

x	DataFrame or data.table
col_names	character vector, columns in which duplication are searched for
output	string with the output format to be returned - one of "index" (index of duplicates) or "data" (subset of input data with duplicates)

Value

integer vector or data.table with duplicated rows

Examples

```
dt <- data.table::data.table(a = c(1, 2, 3), b = c(3, 2, 2))
get_duplicated_rows(dt, "b")
get_duplicated_rows(dt, "b", output = "data")
```

---

get_env_assay_names *get default assay names for the specified filters, i.e. set of assay types, assay groups and assay data types*

Description

get default assay names for the specified filters, i.e. set of assay types, assay groups and assay data types

Usage

```
get_env_assay_names(
  type = NULL,
  group = NULL,
  data_type = NULL,
  prettify = FALSE,
  simplify = TRUE
)
```

Arguments

type	charvec of assay types
group	charvec of assay groups
data_type	charvec assay of data types
prettify	logical flag, prettify the assay name?
simplify	logical flag, simplify the output? will return single string instead of named vector with single element useful when function is expected to return single element/assay only

Value

charvec

Author(s)

Arkadiusz Gładki <arkadiusz.gladki@contractors.roche.com>

Examples

```
get_env_assay_names()
```

`get_env_var` *safe wrapper of Sys.getenv()*

Description

So far the helper is needed to handle env vars containing : for which the backslash is automatically added in some contexts and R could not get the original value for these env vars.

Usage

```
get_env_var(x, ...)
```

Arguments

x	string with the name of the environmental variable
...	additional params for Sys.getenev

Value

sanitized value of the env variable

Examples

```
get_env_var("HOME")
```

`get_expect_one_identifiers`
Get identifiers that expect only one value for each identifier.

Description

Get identifiers that expect only one value for each identifier.

Usage

```
get_expect_one_identifiers()
```

Value

charvec

Examples

```
get_expect_one_identifiers()
```

get_experiment_groups *get_experiment_groups*

Description

get experiment groups

Usage

```
get_experiment_groups(type = NULL)
```

Arguments

type	String indicating the name of an assay group. Defaults to all experiment groups.

Value

list with experiment groups or string (if type not NULL)

Author(s)

Arkadiusz Gladki arkadiusz.gladki@contractors.roche.com

Examples

```
get_experiment_groups()
```

get_gDR_session_info *get gDR package and their version installed in the environment*

Description

get gDR package and their version installed in the environment

Usage

```
get_gDR_session_info(pattern = "^gDR")
```

Arguments

pattern	string with the pattern to grep R packages from the list of installed packages

Value

data.table with gDR packages and their versions

Examples

```
get_gDR_session_info()
```

`get_identifiers_dt` *Get descriptions for identifiers*

Description

Get descriptions for identifiers

Usage

```
get_identifiers_dt(k = NULL, get_description = FALSE, get_example = FALSE)
```

Arguments

`k`	identifier key, string
`get_description`	return descriptions only, boolean
`get_example`	return examples only, boolean

Value

named list

Examples

```
get_identifiers_dt()
```

`get_idfs_synonyms` *Get gDR synonyms for the identifiers*

Description

Get gDR synonyms for the identifiers

Usage

```
get_idfs_synonyms()
```

Value

charvec

Examples

```
get_idfs_synonyms()
```

`get_isobologram_columns` *Get isobologram column names*

Description

Get isobologram column names

Usage

```
get_isobologram_columns(k = NULL, prettify = TRUE)
```

Arguments

k	key
prettify	change to upper case and add underscore, iso_level –> Iso_Level

Value

character vector of isobologram column names for combination data

Examples

```
get_isobologram_columns()
get_isobologram_columns("iso_level", prettify = TRUE)
```

`get_MAE_identifiers` *get_MAE_identifiers*

Description

get the identifiers of all SE's in the MAE

Usage

```
get_MAE_identifiers(mae)
```

Arguments

mae	MultiAssayExperiment

Value

named list with identifiers for each SE

Examples

```
mae <- get_synthetic_data("finalMAE_small.qs2")
get_MAE_identifiers(mae)
```

`get_non_empty_assays` *get_non_empty_assays*

Description

get non empty assays

Usage

```
get_non_empty_assays(mae)
```

Arguments

`mae`	MultiAssayExperiment object

Value

charvec with non-empty experiments

Author(s)

Arkadiusz Gladki arkadiusz.gladki@contractors.roche.com

Examples

```
mae <- get_synthetic_data("finalMAE_small.qs2")
get_non_empty_assays(mae)
```

`get_optional_coldata_fields` *get optional colData fields*

Description

get optional colData fields

Usage

```
get_optional_coldata_fields(se)
```

Arguments

`se`	a SummarizedExperiment object with drug-response data generate by gDR pipeline

Value

a charvec containing the names of the optional identifiers in the SE colData

`get_optional_rowdata_fields` *get optional rowData fields*

Description

get optional rowData fields

Usage

```
get_optional_rowdata_fields(se)
```

Arguments

`se`	a SummarizedExperiment object with drug-response data generate by gDR pipeline

Value

a charvec containing the names of the optional identifiers in the SE rowData

get_required_identifiers

Get identifiers required for downstream analysis.

Description

Get identifiers required for downstream analysis.

Usage

```
get_required_identifiers()
```

Value

charvec

Examples

```
get_required_identifiers()
```

get_settings_from_json

Get settings from JSON file In most common scenario the settings are stored in JSON file to avoid hardcoding

Description

Get settings from JSON file In most common scenario the settings are stored in JSON file to avoid hardcoding

Usage

```
get_settings_from_json(
  s = NULL,
  json_path = system.file(package = "gDRutils", "settings.json")
)
```

Arguments

s	charvec with setting entry/entries
json_path	string with the path to the JSON file

Value

value/values for entry/entries from JSON file

Examples

```
if (!nchar(system.file(package="gDRutils"))) {
   get_settings_from_json()
}
```

`get_supported_experiments` *get_supported_experiments*

Description

get supported experiments

Usage

```
get_supported_experiments(type = NULL)
```

Arguments

`type`	String indicating the type of experiment

Value

charvec with supported experiment name(s)

Author(s)

Arkadiusz Gladki arkadiusz.gladki@contractors.roche.com

Examples

```
get_supported_experiments()
```

get_synthetic_data *Get synthetic data from gDRtestData package*

Description

Get synthetic data from gDRtestData package

Usage

```
get_synthetic_data(qs)
```

Arguments

qs	dataset name or qs2 filename (e.g. "small" or "finalMAE_small.qs2")

Value

loaded data

Examples

```
get_synthetic_data("finalMAE_small.qs2")
```

get_testdata *get_testdata*

Description

Function to obtain data from gDRtestData and prepare for unit tests

Usage

```
get_testdata()
```

Value

list with drugs, cell_lines, raw_data and assay_data

Examples

```
get_testdata()
```

get_testdata_codilution *get_testdata_codilution*

Description

Function to obtain data from gDRtestData and prepare for unit tests

Usage

```
get_testdata_codilution()
```

Value

list with drugs, cell_lines, raw_data and assay_data

Examples

```
get_testdata_codilution()
```

get_testdata_combo *get_testdata_combo*

Description

Function to obtain data from gDRtestData and prepare for unit tests

Usage

```
get_testdata_combo()
```

Value

list with drugs, cell_lines, raw_data and assay_data

Examples

```
get_testdata_combo()
```

has_assay_dt_duplicated_rows

check if assay data contains duplicated data

Description

An auxiliary function that checks for duplicates in the assay data

Usage

```
has_assay_dt_duplicated_rows(dt)
```

Arguments

dt	data.table with assay data

Value

logical flag indicating if a dt contains duplicated rows or not

Examples

```
sdata <- get_synthetic_data("finalMAE_small.qs2")
smetrics_data <- convert_se_assay_to_dt(sdata[[1]], "Metrics")
has_assay_dt_duplicated_rows(smetrics_data)
```

has_dt_duplicated_rows

check if data.table contains duplicated data

Description

An auxiliary function that checks for duplicates in the data.table (or its subset)

Usage

```
has_dt_duplicated_rows(dt, col_names = NULL)
```

Arguments

dt	data.table
col_names	charvec with columns to be used for subsetting

Value

logical flag indicating if a dt contains duplicated rows or not

Examples

```
dt <- data.table::data.table(a = c(1, 2, 3), b = c(3, 2, 2))
has_dt_duplicated_rows(dt, "b")
```

`has_single_codrug_data` *Has Single Codrug Data*

Description

Has Single Codrug Data

Usage

```
has_single_codrug_data(
  cols,
  prettify_identifiers = TRUE,
  codrug_identifiers = c("drug_name2", "concentration2")
)
```

Arguments

`cols`	character vector with the columns of the input data
`prettify_identifiers`	logical flag specifying if identifiers are expected to be prettified
`codrug_identifiers`	character vector with identifiers for the codrug columns

Value

logical flag

Examples

```
has_single_codrug_data("Drug Name")
has_single_codrug_data(c("Drug Name", "Cell Lines"))
has_single_codrug_data(c("Drug Name 2", "Concentration 2"))
has_single_codrug_data(
  get_prettified_identifiers(
    c("concentration2", "drug_name2"),
    simplify = FALSE
  )
)
```

`has_valid_codrug_data` *Has Valid Codrug Data*

Description

Has Valid Codrug Data

Usage

```
has_valid_codrug_data(
  data,
  prettify_identifiers = TRUE,
  codrug_name_identifier = "drug_name2",
  codrug_conc_identifier = "concentration2"
)
```

Arguments

`data`	data.table with input data
`prettify_identifiers`	logical flag specifying if identifiers are expected to be prettified
`codrug_name_identifier`	string with the identifiers for the codrug drug_name column
`codrug_conc_identifier`	string with the identifiers for the codrug concentration column

Value

logical flag

Examples

```
dt <-
  data.table::data.table(
    "Drug Name" = letters[seq_len(3)],
    "Concentration" = seq_len(3),
    "Drug Name 2" = letters[4:6],
    "Concentration 2" = 4:6
  )
has_valid_codrug_data(dt)

dt$`Concentration 2` <- NULL
has_valid_codrug_data(dt)
```

headers *Get or reset headers for one or all header field(s) respectively*

Description

Get the expected header(s) for one field or reset all header fields

Usage

```
get_header(k = NULL)
```

Arguments

k	string of field (data type) to return headers for

Details

If `get_header` is called with no values, the entire available header list is returned.

Value

For `get_header` a character vector of headers for field `k`.

Examples

```
get_header(k = NULL)
get_header("manifest")
```

identifiers *Get, set, or reset identifiers for one or all identifier field(s)*

Description

Get, set, or reset the expected identifier(s) for one or all identifier field(s). Identifiers are used by the gDR processing functions to identify which columns in a `data.table` correspond to certain expected fields. Functions of the family `*et_identifier` will look for identifiers from the environment while functions of the family `*et_SE_identifiers` will look for identifiers in the `metadata` slot of a `SummarizedExperiment` object. See details for expected identifiers and their definitions.

Usage

```
get_env_identifiers(k = NULL, simplify = TRUE)

get_prettified_identifiers(k = NULL, simplify = TRUE)

set_env_identifier(k, v)

reset_env_identifiers()
```

Arguments

k	String corresponding to identifier name.
simplify	Boolean indicating whether output should be simplified.
v	Character vector corresponding to the value for given identifier k.

Details

Identifiers supported by the gDR suite include:

- "barcode": String of column name containing barcode metadata
- "cellline": String of column name containing unique, machine-readable cell line identifiers
- "cellline_name": String of column name containing human-friendly cell line names
- "cellline_tissue": String of column name containing metadata on cell line tissue type
- "cellline_ref_div_time": String of column name containing reference division time for cell lines
- "cellline_parental_identifier": String of column name containing unique, machine-readable parental cell line identifiers. Used in the case of derived or engineered cell lines.
- "drug": String of column name containing unique, machine-readable drug identifiers
- "drug_name": String of column name containing human-friendly drug names
- "drug_moa": String of column name containing metadata for drug mode of action
- "duration": String of column name containing metadata on duration that cells were treated (in hours)
- "template": String of column name containing template metadata
- "untreated_tag": Character vector of entries that identify control, untreated wells
- "well_position": Character vector of column names containing metadata on well positions on a plate

Value

For any setting or resetting functionality, a NULL invisibly. For get_env_identifiers a character vector of identifiers for field k. For functions called with no arguments, the entire available identifier list is returned.

list or charvec depends on unify param

list or charvec depends on unify param

NULL

NULL

Examples

```
get_env_identifiers("duration") # "Duration"
```

identify_unique_se_metadata_fields *Identify unique metadata fields from a list of SummarizedExperiments*

Description

Identify unique metadata fields from a list of SummarizedExperiments

Usage

```
identify_unique_se_metadata_fields(SElist)
```

Arguments

SElist	named list of SummarizedExperiments

Value

character vector of unique names of metadata

Examples

```
mae <- get_synthetic_data("finalMAE_small.qs2")
se <- mae[[1]]
SElist <- list(
  se,
  se
)
identify_unique_se_metadata_fields(SElist)
```

is_any_exp_empty *is_any_exp_empty*

Description

check if any experiment is empty

Usage

```
is_any_exp_empty(mae)
```

Arguments

mae	MultiAssayExperiment object

Value

logical

Author(s)

Arkadiusz Gladki arkadiusz.gladki@contractors.roche.com

Examples

```
mae <- get_synthetic_data("finalMAE_small.qs2")
is_any_exp_empty(mae)
```

---

is_combo_data *Checks if* se *is combo dataset.*

Description

Checks if se is combo dataset.

Usage

```
is_combo_data(se)
```

Arguments

se	SummarizedExperiment

Value

logical

Examples

```
se <- get_synthetic_data("finalMAE_combo_matrix.qs2")[[1]]
is_combo_data(se)
se <- get_synthetic_data("finalMAE_combo_matrix.qs2")[[2]]
is_combo_data(se)
se <- get_synthetic_data("finalMAE_small.qs2")[[1]]
is_combo_data(se)
```

`is_exp_empty` *is_exp_empty*

Description

check if experiment (SE) is empty

Usage

```
is_exp_empty(exp)
```

Arguments

`exp`	SummarizedExperiment object.

Value

logical

Author(s)

Arkadiusz Gladki arkadiusz.gladki@contractors.roche.com

Examples

```
mae <- get_synthetic_data("finalMAE_small.qs2")
se <- mae[[1]]
is_exp_empty(se)
```

`is_mae_empty` *is_mae_empty*

Description

check if all mae experiments are empty

Usage

```
is_mae_empty(mae)
```

Arguments

`mae`	MultiAssayExperiment object

Value

logical

Author(s)

Arkadiusz Gladki arkadiusz.gladki@contractors.roche.com

Examples

```
mae <- get_synthetic_data("finalMAE_small.qs2")
is_mae_empty(mae)
```

---

logisticFit *Logistic fit*

Description

Fit a logistic curve to drug response data.

Usage

```
logisticFit(
  concs,
  norm_values,
  std_norm_values = NA,
  x_0 = 1,
  priors = NULL,
  lower = NULL,
  range_conc = c(0.005, 5),
  force_fit = FALSE,
  pcutoff = 0.05,
  cap = 0.1,
  n_point_cutoff = 4,
  capping_fold = 5
)
```

Arguments

concs	concentrations that have not been transformed into log space.
norm_values	normalized response values (Untreated = 1).
std_norm_values	std of values.
x_0	upper limit. Defaults to 1. For co-treatments, this value should be set to NA.
priors	numeric vector containing starting values for all. mean parameters in the model. Overrules any self starter function.

lower	numeric vector of lower limits for all parameters in a 4-param model.
range_conc	range of concentration for calculating AOC_range.
force_fit	boolean indicating whether or not to force a parameter-based fit.
pcutoff	numeric of pvalue significance threshold above or equal to which to use a constant fit.
cap	numeric value capping norm_values to stay below (x_0 + cap).
n_point_cutoff	integer indicating number of unique concentrations required to fit curve.
capping_fold	Integer value of the fold number to use for capping IC50/GR50. Default is 5.

Details

Implementation of the genedata approach for curve fit: https://screener.genedata.com/documentation/display/DOC21/Busines
Rules-for-Dose-Response-Curve-Fitting,-Model-Selection,-and-Fit-Validity.html #nolint

The output parameter names correspond to the following definitions:

x_mean The mean of a given dose-response metric

x_AOC_range The range of the area over the curve

x_AOC The area over the GR curve or, respectively, under the relative cell count curve, averaged over the range of concentration values

xc50 The concentration at which the effect reaches a value of 0.5 based on interpolation of the fitted curve

x_max The maximum effect of the drug

ec50 The drug concentration at half-maximal effect

x_inf The asymptotic value of the sigmoidal fit to the dose-response data as concentration goes to infinity

x_0 The asymptotic metric value corresponding to a concentration of 0 for the primary drug

h The hill coefficient of the fitted curve, which reflects how steep the dose-response curve is

r2 The goodness of the fit

x_sd_avg The standard deviation of GR/IC

fit_type This will be given by one of the following:

- "DRC4pHillFitModel" Successfully fit with a 4-parameter model
- "DRC3pHillFitModelFixS0" Successfully fit with a 3-parameter model
- "DRCConstantFitResult" Successfully fit with a constant fit
- "DRCTooFewPointsToFit" Not enough points to run a fit
- "DRCInvalidFitResult" Fit was attempted but failed

maxlog10Concentration The highest log10 concentration

N_conc Number of unique concentrations

Value

data.table with metrics and fit parameters.

Examples

```
logisticFit(
c(0.001, 0.00316227766016838, 0.01, 0.0316227766016838),
c(0.9999964000144, 0.999964001439942, 0.999640143942423, 0.996414342629482),
rep(0.1, 4),
priors = c(2, 0.4, 1, 0.00658113883008419)
)
```

`loop` *Conditional lapply or bplapply with optional batch processing.*

Description

Conditional lapply or bplapply with optional batch processing.

Usage

```
loop(
  x,
  FUN,
  parallelize = TRUE,
  use_batch = as.logical(Sys.getenv("GDR_USE_BATCH", "FALSE")),
  temp_dir = Sys.getenv("GDR_TEMP_DIR", tempdir()),
  batch_size = as.numeric(Sys.getenv("GDR_BATCH_SIZE", 100)),
  ...
)
```

Arguments

`x`	Vector (atomic or list) or an expression object. Other objects (including classed objects) will be coerced by as.list
`FUN`	A user-defined function to apply to each element of `x`.
`parallelize`	Logical indicating whether or not to parallelize the computation. Defaults to `TRUE`.
`use_batch`	Logical indicating whether to use batch processing to save intermediate results. Defaults to `FALSE`.
`temp_dir`	Character string specifying the directory where batch results are saved. Defaults to `tempdir()`.
`batch_size`	Integer specifying the number of elements to process in each batch during batch mode. Defaults to `100`.
`...`	Optional arguments passed to bplapply if `parallelize == TRUE`, else to lapply.

Details

The function operates in two modes:

1. Regular mode: Directly applies FUN to the elements using lapply or bplapply.
2. Batch mode: Saves results in batches to disk, allowing computation to resume from the last saved step. Batch mode is activated by setting use_batch to TRUE.

Value

List containing output of FUN applied to every element in x. When batch processing is enabled, results are saved incrementally and merged at the end of processing.

Examples

```
# Regular processing
loop(list(1, 2, 3), function(x) x^2, parallelize = FALSE, use_batch = FALSE)

# Batch processing
loop(1:10, function(x) x^2, parallelize = TRUE, use_batch = TRUE)
```

MAEpply *Lapply through all the experiments in MultiAssayExperiment object*

Description

Lapply through all the experiments in MultiAssayExperiment object

Usage

```
MAEpply(mae, FUN, unify = FALSE, ...)
```

Arguments

mae	MultiAssayExperiment object
FUN	function that should be applied on each experiment of MultiAssayExperiment object
unify	logical indicating if the output should be a unlisted object of unique values across all the experiments
...	Additional args to be passed to teh FUN.

Value

list or vector depends on unify param

Author(s)

Bartosz Czech bartosz.czech@contractors.roche.com

Examples

```
mae <- get_synthetic_data("finalMAE_small.qs2")
MAEpply(mae, SummarizedExperiment::assayNames)
```

`map_conc_to_standardized_conc` *Create a mapping of concentrations to standardized concentrations.*

Description

Create a mapping of concentrations to standardized concentrations.

Usage

```
map_conc_to_standardized_conc(conc1, conc2)
```

Arguments

`conc1`	numeric vector of the concentrations for drug 1.
`conc2`	numeric vector of the concentrations for drug 2.

Details

The concentrations are standardized in that they will contain regularly spaced dilutions and close values will be rounded.

Value

data.table of 2 columns named `"concs"` and `"rconcs"` containing the original concentrations and their closest matched standardized concentrations respectively. and their new standardized concentrations.

Examples

```
ratio <- 0.5
conc1 <- c(0, 10 ^ (seq(-3, 1, ratio)))

shorter_range <- conc1[-1]
noise <- runif(length(shorter_range), 1e-12, 1e-11)
conc2 <- shorter_range + noise

map_conc_to_standardized_conc(conc1, conc2)
```

mcolData *mcolData*

Description

get colData of all experiments

Usage

```
mcolData(mae)
```

Arguments

mae	MultiAssayExperiment object

Value

data.table with all-experiments colData

Author(s)

Arkadiusz Gladki arkadiusz.gladki@contractors.roche.com

Examples

```
mae <- get_synthetic_data("finalMAE_small.qs2")
mcolData(mae)
```

merge_assay *Merge assay data*

Description

Merge assay data

Usage

```
merge_assay(
  SElist,
  assay_name,
  additional_col_name = "data_source",
  discard_keys = NULL
)
```

Arguments

SElist	named list of Summarized Experiments
assay_name	name of the assay that should be extracted and merged
additional_col_name	string of column name that will be added to assay data for the distinction of possible duplicated metrics that can arise from multiple projects
discard_keys	character vector of string that will be discarded during creating BumpyMatrix object

Value

BumpyMatrix or list with data.table + BumpyMatrix

Examples

```
mae <- get_synthetic_data("finalMAE_combo_2dose_nonoise.qs2")

listSE <- list(
  combo1 = mae[[1]],
  sa = mae[[2]]
)
merge_assay(listSE, "Normalized")
```

---

merge_MAE *Merge multiple MultiAssayExperiment objects*

Description

Merge multiple MultiAssayExperiment objects

Usage

```
merge_MAE(
  MAElist,
  additional_col_name = "data_source",
 discard_keys = c("normalization_type", "fit_source", "record_id", "isDay0", "swap_sa",
    "control_type", "iso_level", "conc_1", "conc_2"),
  title = NULL,
  description = NULL,
  source_name = NULL,
  source_id = NULL
)
```

Arguments

MAElist	Named list of MultiAssayExperiment objects.
additional_col_name	String with the name of the column that will be added to assay data for the distinction of possible duplicated metrics that can arise from multiple projects.
discard_keys	Character vector of strings that will be discarded during creating BumpyMatrix object.
title	String specifying the final DataSetDB title. If NULL, auto-generates.
description	String specifying the final DataSetDB description. If NULL, auto-generates.
source_name	String specifying the standard DSDB source name. If NULL, auto-detects or uses "merged_analysis".
source_id	String specifying the unique DSDB source ID. If NULL, uses "merged_dataset".

Value

Merged MultiAssayExperiment object.

Examples

```
mae1 <- get_synthetic_data("finalMAE_combo_2dose_nonoise.qs2")
mae2 <- get_synthetic_data("finalMAE_combo_2dose_nonoise.qs2")
merge_MAE(list(mae1 = mae1, mae2 = mae2), title = "Test", description = "Test MAE")
```

---

merge_metadata *Merge metadata*

Description

Merge metadata

Usage

```
merge_metadata(SElist, metadata_fields)
```

Arguments

SElist	named list of SummarizedExperiments
metadata_fields	vector of metadata names that will be merged

Value

list of merged metadata

Examples

```
mae <- get_synthetic_data("finalMAE_small.qs2")
se <- mae[[1]]
listSE <- list(
  se,
  se
)
metadata_fields <- identify_unique_se_metadata_fields(listSE)
merge_metadata(listSE, metadata_fields)
```

`merge_SE` *Merge multiple Summarized Experiments*

Description

Merge multiple Summarized Experiments

Usage

```
merge_SE(
  SElist,
  additional_col_name = "data_source",
 discard_keys = c("normalization_type", "fit_source", "record_id", "isDay0", "swap_sa",
    "control_type", "iso_level", "conc_1", "conc_2")
)
```

Arguments

`SElist`	named list of Summarized Experiments
`additional_col_name`	string with the name of the column that will be added to assay data for the distinction of possible duplicated metrics that can arise from multiple projects
`discard_keys`	character vector of string that will be discarded during creating BumpyMatrix object

Value

merged SummarizedExperiment object

Examples

```
se1 <- get_synthetic_data("finalMAE_small.qs2")[[1]]
merge_SE(list(se1 = se1, se2 = se1))
```

`modifyData` *modify assay with additional data*

Description

Reduce dimensionality of an assay by dropping extra data or combining variables.

Usage

```
modifyData(x, ...)

## S3 method for class 'drug_name2'
modifyData(x, option, keep, ...)

## S3 method for class 'data_source'
modifyData(x, option, keep, ...)

## Default S3 method:
modifyData(x, option, keep, ...)
```

Arguments

`x`	a `data.table` containing an assay
`...`	additional arguments passed to methods
`option`	character string specifying the action to be taken, see `Details`
`keep`	character string specifying the value of the active variable that will be kept

Details

If an essay extracted from a `SummarizedExperiment` contains additional information, i.e. factors beyond `DrugName` and `CellLineName`, that information will be treated in one of three ways, depending on the value of `option`:

- `drop`: Some information will be discarded and only one value of the additional variable (chosen by the user) will be kept.
- `toDrug`: The information is pasted together with the primary drug name. All observations are kept.
- `toCellLine`: As above, but pasting is done with cell line name.

Depending on the type of additional information, the exact details will differ. This is handled in the app by adding special classes to the data tables and dispatching to S3 methods.

Following modification, the additional columns are discarded.

Value

modified object

Methods (by class)

- `modifyData(drug_name2)`: includes the name and concentration of the second drug
- `modifyData(data_source)`: includes the data source
- `modifyData(default)`: includes the name of other additional variables

Examples

```
dt <- data.table::data.table(a = as.character(1:10), b = "data")
dt <- addClass(dt, "a")
modifyData(dt, "average", keep = "b")
```

`mrowData` *mrowData*

Description

get rowData of all experiments

Usage

```
mrowData(mae)
```

Arguments

`mae`	MultiAssayExperiment object

Value

data.table with all-experiments rowData

Author(s)

Arkadiusz Gladki arkadiusz.gladki@contractors.roche.com

Examples

```
mae <- get_synthetic_data("finalMAE_small.qs2")
mrowData(mae)
```

predict_conc_from_efficacy *Predict a concentration for a given efficacy with fit parameters.*

Description

Predict a concentration for a given efficacy with fit parameters.

Usage

```
predict_conc_from_efficacy(efficacy, x_inf, x_0, ec50, h)
```

Arguments

efficacy	Numeric vector representing efficacies to predict concentrations for.
x_inf	Numeric vector representing the asymptotic value of the sigmoidal fit to the dose-response data as concentration goes to infinity.
x_0	Numeric vector representing the asymptotic metric value corresponding to a concentration of 0 for the primary drug.
ec50	Numeric vector representing the drug concentration at half-maximal effect.
h	Numeric vector representing the hill coefficient of the fitted curve, which reflects how steep

Details

The inverse of this function is predict_efficacy_from_conc.

Value

Numeric vector representing predicted concentrations from given efficacies and fit parameters.

See Also

predict_efficacy_from_conc .calculate_x50

Examples

```
predict_conc_from_efficacy(efficacy = c(1, 1.5), x_inf = 0.1, x_0 = 1, ec50 = 0.5, h = 2)
```

predict_efficacy_from_conc *Predict efficacy values given fit parameters and a concentration.*

Description

Predict efficacy values given fit parameters and a concentration.

Usage

```
predict_efficacy_from_conc(c, x_inf, x_0, ec50, h)
```

Arguments

c	Numeric vector representing concentrations to predict efficacies for.
x_inf	Numeric vector representing the asymptotic value of the sigmoidal fit to the dose-response data as concentration goes to infinity.
x_0	Numeric vector representing the asymptotic metric value corresponding to a concentration of 0 for the primary drug.
ec50	Numeric vector representing the drug concentration at half-maximal effect.
h	Numeric vector representing the hill coefficient of the fitted curve, which reflects how steep the dose-response curve is.

Details

The inverse of this function is `predict_conc_from_efficacy`.

Value

Numeric vector representing predicted efficacies from given concentrations and fit parameters.

See Also

predict_conc_from_efficacy

Examples

```
predict_efficacy_from_conc(c = 1, x_inf = 0.1, x_0 = 1, ec50 = 0.5, h = 2)
```

predict_smooth_from_combo *Predict a smoothed response for a drug combination*

Description

Predicts a 'smooth' value for a single pair of drug concentrations by snapping to the nearest available models from a metrics table and averaging their predictions. This is the combination equivalent of 'predict_efficacy_from_conc'.

Usage

```
predict_smooth_from_combo(conc_1, conc_2, metrics_merged)
```

Arguments

conc_1	A single numeric value for the desired concentration of the first drug.
conc_2	A single numeric value for the desired concentration of the second drug.
metrics_merged	A data.table containing all pre-calculated curve fit parameters. Expects columns: 'dilution_drug', 'cotrt_value', 'ratio', 'ec50', 'h', 'x_inf', 'x_0'.

Value

A single numeric value for the predicted 'smooth' response.

Examples

```
mae <- get_synthetic_data("combo_matrix")
se <- mae[[gDRutils::get_supported_experiments("combo")]]
dt_metrics <- gDRutils::convert_se_assay_to_dt(se[1, 1], "Metrics")[normalization_type == "RV"]
predict_smooth_from_combo(conc_1 = 1.2, conc_2 = 9.8, metrics_merged = dt_metrics)
```

---

prettify_flat_metrics *Prettify metric names in flat 'Metrics' assay*

Description

Map existing column names of a flattened 'Metrics' assay to prettified names.

Usage

```
prettify_flat_metrics(
  x,
  human_readable = FALSE,
  normalization_type = c("GR", "RV")
)
```

Arguments

x	character vector of names to prettify.
human_readable	boolean indicating whether or not to return column names in human readable format. Defaults to FALSE.
normalization_type	character vector with a specified normalization type. Defaults to c("GR", "RV").

Details

A common use case for this function is to prettify column names from a flattened version of the "Metrics" assay. Mode "human_readable" = TRUE is often used for prettification in the context of front-end applications, whereas "human_readable" = FALSE is often used for prettification in the context of the command line.

Value

character vector of prettified names.

Examples

```
x <- c("CellLineName", "Tissue", "Primary Tissue", "GR_gDR_x_mean", "GR_gDR_xc50", "RV_GDS_x_mean")
prettify_flat_metrics(x, human_readable = FALSE)
```

---

process_batch *Process and save a batch of results.*

Description

Process and save a batch of results.

Usage

```
process_batch(
  batch,
  start_index,
  fun_name,
  unique_id,
  total_iterations,
  temp_dir,
  FUN,
  ...
)
```

Arguments

batch	A subset of the vector or list x to be processed.
start_index	Integer indicating the starting index of the batch in the original vector x.
fun_name	Character string representing the name of the function FUN for use in file naming.
unique_id	String with unique identifier for the current task and user to ensure file uniqueness.
total_iterations	Integer indicating the total number of iterations in the original vector x.
temp_dir	Character string specifying the directory where batch results are saved.
FUN	A user-defined function to apply to each element of the batch.
...	Optional arguments passed to FUN.

Details

The function applies FUN to each element in batch, saves the results to a file named according to the format <fun_name>_<unique_id>_<start_index>_of_<total_iterations>_batch.qs2, and clears memory using gc() after saving.

Value

This function does not return a value. It saves the processed batch results to disk as a .qs2 file.

Examples

```
process_batch(list(1, 2, 3), 100, "my_function", "unique_task_id_user", 1000, tempdir(), function(x) x^2)
```

---

promote_fields *Promote a nested field to be represented as a metadata field of the* SummarizedExperiment *as either the* rowData *or* colData.

Description

Promote a nested field to be represented as a metadata field of the SummarizedExperiment as either the rowData or colData.

Usage

```
promote_fields(se, fields, MARGIN = c(1, 2))
```

Arguments

se	SummarizedExperiment object.
fields	Character vector of nested fields in a BumpyMatrix object to promote to metadata fields of a se.
MARGIN	Numeric of values 1 or 2 indicating whether to promote fields to rows or columns respectively.

Details

Revert this operation using `demote_fields`.

Value

A `SummarizedExperiment` object with new dimensions resulting from promoting given `fields`.

See Also

demote_fields

Examples

```
mae <- get_synthetic_data("finalMAE_small.qs2")
se <- mae[[1]]
se <- promote_fields(se, "ReadoutValue", 2)
```

---

refine_coldata *refine colData*

Description

current improvements done on the colData as a standardization step:

- set default value for optional colData fields

Usage

```
refine_coldata(cd, se, default_v = "Undefined")
```

Arguments

`cd`	DataFrame with colData
`se`	a SummarizedExperiment object with drug-response data generate by gDR pipeline
`default_v`	string with default value for optional columns in colData

Value

refined colData

Examples

```
mae <- get_synthetic_data("finalMAE_small.qs2")
refine_coldata(SummarizedExperiment::colData(mae[[1]]), mae[[1]])
```

refine_rowdata *refine rowData*

Description

current improvements done on the rowData as a standardization step:

- set default value for optional rowData fields

Usage

```
refine_rowdata(rd, se, default_v = "Undefined")
```

Arguments

rd	DataFrame with rowData
se	a SummarizedExperiment object with drug-response data generate by gDR pipeline
default_v	string with default value for optional columns in rowData

Value

refined rowData

Examples

```
mae <- get_synthetic_data("finalMAE_small.qs2")
refine_rowdata(SummarizedExperiment::colData(mae[[1]]), mae[[1]])
```

remove_codrug_data *Remove Codrug Data*

Description

Remove Codrug Data

Usage

```
remove_codrug_data(
  data,
  prettify_identifiers = TRUE,
  codrug_identifiers = c("drug_name2", "concentration2")
)
```

Arguments

data	data.table with input data
prettify_identifiers	logical flag specifying if identifiers are expected to be prettified
codrug_identifiers	character vector with identifiers for the codrug columns

Value

data.table without combination columns

Examples

```
dt <-
  data.table::data.table(
    "Drug Name" = letters[seq_len(3)],
    "Concentration" = seq_len(3),
    "Drug Name 2" = letters[4:6],
    "Concentration 2" = 4:6
  )
dt
remove_codrug_data(dt)
```

---

remove_drug_batch *Remove batch substring from drug id*

Description

Gnumber, i.e. "G12345678" is currently the default format of drug_id. It's also used as a drug name in some cases.

Usage

```
remove_drug_batch(
  drug_vec,
  drug_p = "^G[0-9]{8}",
  sep_p = "[^0-9|^_]",
  batch_p = ".+"
)
```

Arguments

drug_vec	atomic vector (e.g., character or integer) with drug id(s)
drug_p	string with regex pattern for drug id. Set to Gnumber format by default: "G[0-9]{8}".

sep_p	string with regex pattern for separator. Set to any character except for digit and space
batch_p	string with regex pattern for batch substring. By default set to any character(s): ".+"

Details

By default, Gnumber(s) followed by any character (except for underscore and any digit) and any batch substring are cleaned:

- G00060245.18 => G00060245
- G00060245.1-8 => G00060245
- G02948263.1-1.DMA => G02948263
- Gnumber followed by the codrug
  - G03252046.1-2;G00376771 => G03252046
- Gnumber followed by the two codrugs
  - G03256376.1-2;G00376771.1-19;G02557755 => G03256376
- Gnumber followed by the drug name
  - G00018838, Cisplatin => G00018838

By default, Gnumber(s) followed by the "_" or digit (regardless the batch substring) are not cleaned:

- Gnumber with suffix added to prevent duplicated ids
  - G00060245_(G00060245.1-8)
- too long Gnumber
  - G123456789.1-12

Value

charvec with Gnumber(s)

Examples

```
remove_drug_batch("G00060245.18")
remove_drug_batch("G00060245.1-8")
remove_drug_batch("G00060245.1-1.DMA")

remove_drug_batch("G03252046.1-2;G00376771")
remove_drug_batch("G00018838, Cisplatin")
remove_drug_batch("G03256376.1-2;G00376771.1-19;G02557755")
remove_drug_batch("G00060245_(G00060245.1-8)")
remove_drug_batch(c("G00060245.18", "G00060245.1-8", "G00060245.1-1.DMA"))

remove_drug_batch("DRUG_01.123", drug_p = "DRUG_[0-9]+")
remove_drug_batch("G00001234:22-1", sep_p = ":")
remove_drug_batch("G00001234.28", batch_p = "[0-9]+")
```

rename_bumpy *Rename BumpyMatrix*

Description

Rename BumpyMatrix

Usage

```
rename_bumpy(bumpy, mapping_vector)
```

Arguments

bumpy	a BumpyMatrix object
mapping_vector	a named vector for mapping old and new values. The names of the character vector indicate the source names, and the corresponding values the destination names.

Value

a renamed BumpyMatrix object

Examples

```
mae <- get_synthetic_data("finalMAE_small.qs2")
se <- mae[[1]]
assay <- SummarizedExperiment::assay(se)
rename_bumpy(assay, c("Concentration" = "conc"))
```

rename_DFrame *Rename DFrame*

Description

Rename DFrame

Usage

```
rename_DFrame(df, mapping_vector)
```

Arguments

df	a DFrame object
mapping_vector	a named vector for mapping old and new values. The names of the character vector indicate the source names, and the corresponding values the destination names.

Value

a renamed DFrame object

Examples

```
mae <- get_synthetic_data("finalMAE_small.qs2")
rename_DFrame(SummarizedExperiment::rowData(mae[[1]]), c("Gnumber" = "Gnumber1"))
```

---

round_concentration *Round concentration to ndigit significant digits*

Description

Round concentration to ndigit significant digits

Usage

```
round_concentration(x, ndigit = 3)
```

Arguments

x	value to be rounded.
ndigit	number of significant digits (default = 4).

Value

rounded x

Examples

```
round_concentration(x = c(0.00175,0.00324,0.0091), ndigit = 1)
```

---

set_constant_fit_params *Set fit parameters for a constant fit.*

Description

Replace values for flat fits: ec50 = 0, h = 0.0001 and xc50 = +/- Inf

Usage

```
set_constant_fit_params(out, mean_norm_value)
```

Arguments

out	Named list of fit parameters.
mean_norm_value	Numeric value that be used to set all parameters that can be calculated from the mean.

Value

Modified named list of fit parameters.

Examples

```
na <- list(x_0 = NA)
set_constant_fit_params(na, mean_norm_value = 0.6)
```

---

set_unique_cl_names *Set Unique Parental Identifiers*

Description

This function sets the CellLineName field in colData to be unique by appending the clid in parentheses for duplicates.

Usage

```
set_unique_cl_names(se)
```

Arguments

se	A SummarizedExperiment object.

Value

A SummarizedExperiment object with unique CellLineName in colData.

Examples

```
se <- SummarizedExperiment::SummarizedExperiment(
  assays = list(counts = matrix(1:4, ncol = 2)),
  colData = S4Vectors::DataFrame(CellLineName = c("ID1", "ID1"), clid = c("C1", "C2"))
)
se <- set_unique_cl_names(se)
```

set_unique_cl_names_dt *Set unique primary cell line identifiers in the table*

Description

This function sets the primary cell line field in data.frame-like object to be unique by appending the secondary cell line field in parentheses for duplicates.

Usage

```
set_unique_cl_names_dt(
  dt,
  primary_name = get_env_identifiers("cellline_name"),
  secondary_name = get_env_identifiers("cellline"),
  sep = " "
)
```

Arguments

dt	data.table, data.frame or DFrame with the data
primary_name	string with the name of the primary cell line field
secondary_name	string with the name of the secondary cell line field
sep	string with separator added before suffix

Value

fixed input table with unique primary cell line field in dt

Examples

```
col_data <- S4Vectors::DataFrame(CellLineName = c("ID1", "ID1"), clid = c("C1", "C2"))
col_data <- set_unique_cl_names_dt(col_data)
```

set_unique_drug_names *Set Unique Drug Names*

Description

This function sets the DrugName, DrugName_2, and DrugName_3 fields in rowData to be unique by appending the corresponding Gnumber, Gnumber_2, and Gnumber_3 in parentheses for duplicates.

Usage

```
set_unique_drug_names(se)
```

Arguments

se	A SummarizedExperiment object.

Value

A SummarizedExperiment object with unique DrugName fields in rowData.

Examples

```
se <- SummarizedExperiment::SummarizedExperiment(
  assays = list(counts = matrix(1:9, ncol = 3)),
  rowData = S4Vectors::DataFrame(DrugName = c("DrugA", "DrugA", "DrugB"),
  Gnumber = c("G1", "G2", "G5"),
  DrugName_2 = c("DrugC", "DrugC", "DrugD"),
  Gnumber_2 = c("G3", "G4", "G5")
))
se <- set_unique_drug_names(se)
```

---

set_unique_drug_names_dt

Set unique primary drug identifiers in the table

Description

This function sets the primary drug field(s) in data.frame-like object to be unique by appending the secondary drug field(s) in parentheses for duplicates. By default DrugName, DrugName_2, and DrugName_3 are primary drug fields, while Gnumber, Gnumber_2, and Gnumber_3 are their respective secondary drug fields.

Usage

```
set_unique_drug_names_dt(
  dt,
  primary_names = unlist(get_env_identifiers()[(c("drug_name", "drug_name2",
    "drug_name3"))]),
 secondary_names = unlist(get_env_identifiers()[(c("drug", "drug2", "drug3"))]),
  sep = " "
)
```

Arguments

dt	data.table, data.frame or DFrame with the data
primary_names	charvec with the names of the primary drug field(s)
secondary_names	charvec with the name of the secondary drug field(s)
sep	string with separator added before suffix

Value

fixed input table with unique primary drug field in dt

Examples

```
row_data <- S4Vectors::DataFrame(
  DrugName = c("DrugA", "DrugA", "DrugB"),
  Gnumber = c("G1", "G2", "G5"),
  DrugName_2 = c("DrugC", "DrugC", "DrugD"),
  Gnumber_2 = c("G3", "G4", "G5")
)
row_data <- set_unique_drug_names_dt(row_data)
```

---

set_unique_identifiers

Set Unique Identifiers in MultiAssayExperiment

Description

This function sets the `CellLineName` in `colData` and `DrugName` fields in `rowData` to be unique for each `SummarizedExperiment` in a `MultiAssayExperiment`.

Usage

```
set_unique_identifiers(mae)
```

Arguments

`mae`	A MultiAssayExperiment object.

Value

A MultiAssayExperiment object with unique identifiers.

Examples

```
se1 <- SummarizedExperiment::SummarizedExperiment(
  assays = list(counts = matrix(1:4, ncol = 2)),
 colData = S4Vectors::DataFrame(parental_identifier = c("ID1", "ID1"), clid = c("C1", "C2")),
  rowData = S4Vectors::DataFrame(DrugName = c("DrugA", "DrugA"), Gnumber = c("G1", "G2"))
)
rownames(SummarizedExperiment::colData(se1)) <- c("cl1", "cl2")
rownames(SummarizedExperiment::rowData(se1)) <- c("g1", "g")
se2 <- SummarizedExperiment::SummarizedExperiment(
  assays = list(counts = matrix(5:8, ncol = 2)),
 colData = S4Vectors::DataFrame(parental_identifier = c("ID2", "ID2"), clid = c("C3", "C4")),
  rowData = S4Vectors::DataFrame(DrugName = c("DrugB", "DrugB"), Gnumber = c("G3", "G4"))
)
rownames(SummarizedExperiment::colData(se2)) <- c("cl3", "cl4")
```

```
rownames(SummarizedExperiment::rowData(se2)) <- c("g3", "g4")
mae <- MultiAssayExperiment::MultiAssayExperiment(experiments = list(se1 = se1, se2 = se2))
mae <- set_unique_identifiers(mae)
```

`set_unique_names_dt` *Set unique primary identifiers in the data.frame-like objects*

Description

This function sets the primary field in the data.frame-like objects to be unique by appending the secondary field in parentheses for duplicates.

Usage

```
set_unique_names_dt(dt, primary_name, secondary_name, sep = " ")
```

Arguments

`dt`	data.table, data.frame or DFrame with data
`primary_name`	string with the name of the primary field
`secondary_name`	string with the name of the secondary field
`sep`	string with separator added before suffix

Value

fixed input table with unique primary field in the table

Examples

```
col_data <- S4Vectors::DataFrame(CellLineName = c("ID1", "ID1"), clid = c("C1", "C2"))
col_data <- set_unique_names_dt(col_data, primary_name = "CellLineName", secondary_name = "clid")
```

`SE_metadata` *Get and set metadata for parameters on a SummarizedExperiment object.*

Description

Set metadata for the fitting parameters that define the Metrics assay in SummarizedExperiment object metadata.

Usage

```
set_SE_fit_parameters(se, value)

set_SE_processing_metadata(se, value)

set_SE_keys(se, value)

set_SE_experiment_metadata(se, value, append = TRUE)

set_SE_experiment_raw_data(se, value)

get_SE_fit_parameters(se)

get_SE_processing_metadata(se)

get_SE_experiment_raw_data(se)

get_SE_experiment_metadata(se)

get_SE_keys(se, key_type = NULL)

get_SE_identifiers(se, id_type = NULL, simplify = TRUE)

set_SE_identifiers(se, value)
```

Arguments

se	a SummarizedExperiment object for which to add fit parameter metadata.
value	named list of metadata for fit parameters.
append	Boolean indicating whether to append the new metadata value to the existing entry.
key_type	string of a specific key type (i.e. 'nested_keys', etc.).
id_type	string of a specific id type (i.e. 'duration', 'cellline_name', etc.).
simplify	Boolean indicating whether output should be simplified.

Details

For `*et_SE_processing_metadata`, get/set metadata for the processing info that defines the date_processed and packages versions in SummarizedExperiment object metadata. For `*et_SE_fit_parameters`, get/set metadata for fit parameters used to construct the Metrics assay in a SummarizedExperiment object.

Value

se with added metadata.

Examples

```
mae <- get_synthetic_data("finalMAE_small.qs2")
se <- mae[[1]]
get_SE_fit_parameters(se)

mae <- get_synthetic_data("finalMAE_small.qs2")
se <- mae[[1]]
meta <- get_SE_processing_metadata(se)

mae <- get_synthetic_data("finalMAE_small.qs2")
se <- mae[[1]]
get_SE_experiment_raw_data(se)

mae <- get_synthetic_data("finalMAE_small.qs2")
se <- mae[[1]]
get_SE_experiment_metadata(se)

mae <- get_synthetic_data("finalMAE_small.qs2")
se <- mae[[1]]
get_SE_identifiers(se)
```

---

shorten_normalization_type_name

shorten normalization type

Description

shorten normalization type

Usage

```
shorten_normalization_type_name(x)
```

Arguments

x	string with normalization type

Value

shortened string representing the normalization type

Examples

```
shorten_normalization_type_name("GRvalue")
```

split_big_table_for_xlsx *Split big table*

Description

Helper function for saving big tables in an Excel file. Excel has a sheet size limit, if the table is too large it will not be possible to save such a file. This function allows you to split the table into smaller parts so that saving can be possible

Usage

```
split_big_table_for_xlsx(dt_list, max_row = 1e+06, max_col = 16000)
```

Arguments

dt_list	list of data.tables. Each data.table will be checked and split if meet the criteria
max_row	integer defining the maximum number of rows in one sheet, the rows will be divided into portions of this size. Default value, 1 000 000, is based on excel limit - 1 048 576 with extra safety margin
max_col	integer defining the maximum number of columns in one sheet, the columns will be divided into portions of this size. Default value, 16 000, is based on excel limit - 16 384 with extra safety margin

Value

list of data.tables

Examples

```
too_large_dt <- list(data.table::data.table(matrix(seq_len(300)), nrow = 10))
split_big_table_for_xlsx(too_large_dt, max_row = 250)
```

split_SE_components *split_SE_components*

Description

Divide the columns of an input data.table into treatment metadata, condition metadata, experiment metadata, and assay data for further analysis. This will most commonly be used to identify the different components of a SummarizedExperiment object.

Usage

```
split_SE_components(df_, nested_keys = NULL, combine_on = 1L)
```

Arguments

df_	data.table with drug-response data
nested_keys	character vector of keys to exclude from the row or column metadata, and to instead nest within an element of the matrix. See details.
combine_on	integer value of 1 or 2, indicating whether unrecognized columns should be combined on row or column respectively. Defaults to 1.

Details

Named list containing the following elements:

"treatment_md": treatment metadata

"condition_md": condition metadata

"data_fields": all data.table column names corresponding to fields nested within a BumpyMatrix cell

"experiment_md": metadata that is constant for all entries of the data.table

"identifiers_md": key identifier mappings

The nested_keys provides the user the opportunity to specify that they would not like to use that metadata field as a differentiator of the treatments, and instead, incorporate it into a nested DataFrame in the BumpyMatrix matrix object.

In the event that if any of the nested_keys are constant throughout the whole data.table, they will still be included in the DataFrame of the BumpyMatrix and not in the experiment_metadata.

Columns within the df_ will be identified through the following logic: First, the known data fields and any specified nested_keys are extracted. Following that, known cell and drug metadata fields are detected, and any remaining columns that represent constant metadata fields across all rows are extracted. Next, any cell line metadata will be heuristically extracted. Finally, all remaining columns will be combined on either the rows or columns as specified by combine_on.

Value

named list containing different elements of a SummarizedExperiment; see details.

Examples

```
split_SE_components(data.table::data.table(clid = "CL1", Gnumber = "DrugA"))
```

standardize_mae *Standardize MAE by switching from custom identifiers into gDR-default*

Description

Standardize MAE by switching from custom identifiers into gDR-default

Usage

```
standardize_mae(mae, use_default = TRUE)
```

Arguments

mae	a MultiAssayExperiment object with drug-response data generate by gDR pipeline
use_default	boolean indicating whether or not to use default identifiers for standardization

Value

mae a MultiAssayExperiment with default gDR identifiers

Examples

```
mae <- get_synthetic_data("finalMAE_small.qs2")
S4Vectors::metadata(mae[[1]])$identifiers$drug <- "druug"
standardize_mae(mae)
```

standardize_se *Standardize SE by switching from custom identifiers into gDR-default*

Description

Standardize SE by switching from custom identifiers into gDR-default

Usage

```
standardize_se(se, use_default = TRUE)
```

Arguments

se	a SummarizedExperiment object with drug-response data generate by gDR pipeline
use_default	boolean indicating whether or not to use default identifiers for standardization

Value

se a SummarizedExperiment with default gDR identifiers

Examples

```
mae <- get_synthetic_data("finalMAE_small.qs2")
se <- mae[[1]]
S4Vectors::metadata(se)$identifiers$drug <- "druug"
standardize_se(se)
```

`strip_first_and_last_char` *String first and last characters of a string.*

Description

String first and last characters of a string.

Usage

```
strip_first_and_last_char(jstring)
```

Arguments

`jstring`	String of any number of characters greater than 1.

Details

This is most often used to remove the JSON brackets `'{'` and `'}'`.

Value

String with first and last characters stripped.

`throw_msg_if_duplicates` *throw message if assay data.table contains duplicated rows*

Description

An auxiliary function that checks for duplicated rows in assay data.table, In case of duplicates it throws a message. The messsage function is by default `stop()` The message function can be customized with `msg_f` parameter

Usage

```
throw_msg_if_duplicates(
  dt,
  assay_name = "unknown",
  msg_f = stop,
  preview_max_numb = 4
)
```

Arguments

dt	data.table with assay data
assay_name	string with the name of the assay
msg_f	function to be used to throw the message
preview_max_numb	number of rows to preview if duplicates found

Examples

```
sdata <- get_synthetic_data("finalMAE_small.qs2")
smetrics_data <- convert_se_assay_to_dt(sdata[[1]], "Metrics")
throw_msg_if_duplicates(smetrics_data, assay_name = "Metrics", msg_f = futile.logger::flog.info)
```

---

update_drug_name *Update drug name with additional variables*

Description

Concatenates the values of specified additional variables to the existing drug identifier columns in a data.table, using the variables defined in `get_env_identifiers`.

Usage

```
update_drug_name(dt, additional_vars)
```

Arguments

dt	A data.table containing drug-response information, including drug identifier columns (e.g., `DrugName`, `Gnumber`) and the `additional_vars`.
additional_vars	Character vector of column names (variables) to merge into the drug identifier columns.

Value

A copy of the input data.table `dt` with the relevant drug identifier columns updated to include the additional variable information in the format: `Identifier (variable = value)`.

Examples

```
# Assuming get_env_identifiers() returns c("DrugName", "Gnumber") for drug identifiers
dt <- data.table::data.table(
  DrugName = c("DrugA", "DrugA", "DrugB"),
  Gnumber = c("G1", "G1", "G2"),
  Var1 = c(NA, "X", NA),
  Var2 = c(NA, "Y", "Z")
)
additional_vars <- c("Var1", "Var2")
 dt_updated <- update_drug_name(dt, additional_vars)
# Would update DrugName and Gnumber
dt_updated
```

`update_env_idfs_from_mae` *Update environment identifiers from MAE object identifiers*

Description

Update environment identifiers from MAE object identifiers

Usage

```
update_env_idfs_from_mae(mae_idfs)
```

Arguments

`mae_idfs`	A list containing MAE identifiers

Value

`NULL`

Examples

```
update_env_idfs_from_mae(list(get_env_identifiers()))
```

update_idfs_synonyms *Update gDR synonyms for the identifier*

Description

Update gDR synonyms for the identifier

Usage

```
update_idfs_synonyms(data, dict = get_idfs_synonyms())
```

Arguments

data	list of charvec with identifiers data
dict	list with dictionary

Value

list

Examples

```
mdict <- list(duration = "time")
iv <- c("Time", "Duration", "time")
update_idfs_synonyms(iv, dict = mdict)
```

validate_dimnames *Validate dimnames*

Description

Assure that dimnames of two objects are the same

Usage

```
validate_dimnames(obj, obj2, skip_empty = TRUE)
```

Arguments

obj	first object with dimnames to compare
obj2	second object with dimnames to compare
skip_empty	a logical indicating whether to skip comparison if a given dimname is empty in the case of both objects

Value

NULL

validate_identifiers *Check that specified identifier values exist in the data.*

Description

Check that specified identifier values exist in the data and error otherwise.

Usage

```
validate_identifiers(
  df,
  identifiers = NULL,
  req_ids = NULL,
  exp_one_ids = NULL
)
```

Arguments

df	data.table with colnames.
identifiers	Named list of identifiers where the names are standardized identifier names. If not passed, defaults to get_env_identifiers().
req_ids	Character vector of standardized identifier names required to pass identifier validation.
exp_one_ids	Character vector of standardized identifiers names where only one identifier value is expected. If not passed, defaults to get_expect_one_identifiers().

Details

Note that this does NOT set the identifiers anywhere (i.e. environment or SummarizedExperiment object). If identifiers do not validate, will throw error as side effect.

Value

Named list of identifiers modified to pass validation against the input data. Errors with explanatory message if validation cannot pass with the given identifiers and data.

Examples

```
validate_identifiers(
  S4Vectors::DataFrame("Barcode" = NA, "Duration" = NA, "Template" = NA, "clid" = NA),
  req_ids = "barcode"
)
```

validate_json *Validate JSON against a schema.*

Description

Validate JSON describing an object against a schema.

Usage

```
validate_json(json, schema_path)
```

Arguments

json	String of JSON in memory.
schema_path	String of the schema to validate against.

Details

This is most often used to validate JSON before passing it in as a document to an ElasticSearch index.

Value

Boolean of whether or not JSON successfully validated.

Examples

```
json <- '{}'
```

validate_MAE *Validate MultiAssayExperiment object*

Description

Function validates correctness of SE included in MAE by checking multiple cases:

- detection of duplicated rowData/colData,
- incompatibility of rownames/colnames,
- occurrence of necessary assays,
- detection of mismatch of CLIDs inside colData and colnames (different order),
- correctness of metadata names.

Usage

```
validate_MAE(mae)
```

Arguments

mae	MultiAssayExperiment object produced by the gDR pipeline

Value

NULL invisibly if the MultiAssayExperiment is valid. Throws an error if the MultiAssayExperiment is not valid.

Author(s)

Bartosz Czech bartosz.czech@contractors.roche.com

Examples

```
mae <- get_synthetic_data("finalMAE_small.qs2")
validate_MAE(mae)
```

---

validate_mae_with_schema

Validate MAE against a schema.

Description

Validate MAE object against a schema. Currently only SEs are validated TODO: add mae.json schema and validate full MAE object

Usage

```
validate_mae_with_schema(
  mae,
  schema_package = Sys.getenv("SCHEMA_PACKAGE", "gDRutils"),
  schema_dir_path = Sys.getenv("SCHEMA_DIR_PATH", "schemas"),
  schema = c(se = "se.json", mae = "mae.json")
)
```

Arguments

mae	MultiAssayExperiment object
schema_package	string name of the package with JSON schema files
schema_dir_path	path to the dir with JSON schema files
schema	named charvec with filenames of schemas to validate against.

Value

Boolean of whether or not mae is valid

Examples

```
mae <- get_synthetic_data("finalMAE_small.qs2")
validate_mae_with_schema(mae)
```

`validate_SE` *Validate SummarizedExperiment object*

Description

Function validates correctness of SE by checking multiple cases:

- detection of duplicated rowData/colData,
- incompatibility of rownames/colnames,
- occurrence of necessary assays,
- detection of mismatch of CLIDs inside colData and colnames (different order),
- correctness of metadata names.

Usage

```
validate_SE(se, expect_single_agent = FALSE)
```

Arguments

`se`	SummarizedExperiment object produced by the gDR pipeline
`expect_single_agent`	a logical indicating if the function should check whether the SummarizedExperiment is single-agent data

Value

`NULL` invisibly if the SummarizedExperiment is valid. Throws an error if the SummarizedExperiment is not valid.

Examples

```
mae <- get_synthetic_data("finalMAE_small.qs2")
se <- mae[[1]]
validate_SE(se)
```

validate_se_assay_name *Check whether or not an assay exists in a SummarizedExperiment object.*

Description

Check for the presence of an assay in a SummarizedExperiment object.

Usage

```
validate_se_assay_name(se, name)
```

Arguments

se	A SummarizedExperiment object.
name	String of name of the assay to validate.

Value

NULL invisibly if the assay name is valid. Throws an error if the assay is not valid.

Examples

```
mae <- get_synthetic_data("finalMAE_small.qs2")
se <- mae[[1]]
validate_se_assay_name(se, "RawTreated")
```

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