

Package ‘SRGnet’

April 15, 2017

Title SRGnet An R package for studying synergistic response genes from transcriptomics data

Version 1.0.0

Description

We developed SRMnet to analyze synergistic regulatory mechanisms in transcriptome profiles that act to enhance the overall cell response to combination of mutations, drugs or environmental exposure. This package can be used to identify regulatory modules downstream of synergistic response genes, prioritize synergistic regulatory genes that may be potential intervention targets, and contextualize gene perturbation experiments.

Depends R (>= 3.2.2), EBcoexpress, MASS, igraph, pvclust (>= 2.0-0), RedeR, gRain (>= 1.2-5), gbm (>= 2.1.1), limma, DMwR (>= 0.4.1), matrixStats

License GPL-2

Encoding UTF-8

LazyData true

RoxygenNote 5.0.1.9000

biocViews Software, StatisticalMethod, Regression

Suggests knitr, rmarkdown

VignetteBuilder knitr

NeedsCompilation no

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Differentially_expressed_genes

List of differentially expressed genes in a murine colon cancer model under single and combined mutations of mp53 and Ras

Description

List of differentially expressed genes measured in young adult mouse colonic epithelium (YAMC) in four conditions: bleo/Neo vector control, mu-tant p53-expressing (mp53), activated Ras-expressing, and both mutant genes (mp53/Ras) cells using Affymetrix GeneChip® Mouse Genome 430 2.0 Arrays (GSE9199) (PMC2613942).

Usage

Differentially_expressed_genes

Format

An object of class `data.frame` with 540 rows and 4 columns.

PLCRG

List of synergistic response genes in a murine colon cancer model under single and combined mutations of mp53 and Ras

Description

List of differentially expressed and synergistic response genes measured in young adult mouse colonic epithelium (YAMC) in four conditions: bleo/Neo vector control, mu-tant p53-expressing (mp53), activated Ras-expressing, and both mutant genes (mp53/Ras) cells using Affymetrix GeneChip® Mouse Genome 430 2.0 Arrays (GSE9199) (PMC2613942).

Usage

PLCRG

Format

An object of class `data.frame` with 85 rows and 2 columns.

SRG	<i>Identification of differentially expressed and synergistic response genes (SRGs) in transcriptomics profile</i>
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Description

We use the "SRG" function for identification of synergy or interaction effects between genes in transcriptomics profile in response to combination of mutations, drugs or environmental exposure. SRG returns lists of synergistic response genes and differentially expressed genes, which can be found in home directory of package as text file under title of "List_SRGs" and "List_DEGs", respectively.

Usage

```
SRG(pvalue)
```

Arguments

pvalue A number.

Author(s)

Matthew McCall, Isar Nassiri

Examples

```
{
  data(Transcriptomics)
  SRG(0.01)}
```

SRGnet	<i>Gene regulatory network inference based on predefined list of differentially expressed genes, list of synergistic response genes and transcriptomics profile</i>
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Description

The "SRGnet" can be applied if user has transcriptomic profile, list of differentially expressed genes and synergistic response genes as inputs. The function can be ran in two mode of Slow or Fast. In fast mode, step of expectation maximization for estimation of hyperparameters is omitted. User can run the function in fast or slow mode by using the "F" or "S" as input of "PL()" function, respectively [e.g. SRGs_identification("F")]. SRGs_identification returns the topology of SRMs network and ranked list of genes in network based on differential connectivity score, which can be found in home directory of package under title of "DC_score" and "Topology_of_integrated_network" as text files.

Usage

```
SRGnet(type_of_run)
```

Arguments

type_of_run A character.

Author(s)

Isar Nassiri, Matthew McCall

Examples

```
{
  data(Differentially_expressed_genes)
  data(Transcriptomics)
  data(PLCRG)
  SRGnet("F")
}
```

Transcriptomics	<i>Murine colon cancer transcriptomics profile under single and combined mutations of mp53 and Ras</i>
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Description

Young adult mouse colonic epithelium (YAMC) transcriptomics profile in four conditions: YAMC control, mu-tant p53-expressing (mp53), activated Ras-expressing, and both mutant genes (mp53/Ras) cells using Affymetrix GeneChip® Mouse Genome 430 2.0 Arrays (GSE9199) (PMC2613942).

Usage

Transcriptomics

Format

An object of class `data.frame` with 483 rows and 41 columns.

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