

# Package ‘grndata’

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**Type** Package

**Title** Synthetic Expression Data for Gene Regulatory Network Inference

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**Description** Simulated expression data for five large Gene Regulatory Networks from different simulators

**LazyLoad** yes

**LazyData** yes

**License** GPL-3

**Suggests** RUnit, BiocGenerics, knitr

**VignetteBuilder** knitr

**biocViews** ExperimentData, NetworkInference, GeneExpression, Microarray, GeneRegulation, Network

**Depends** R (>= 2.10)

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|               |                              |
|---------------|------------------------------|
| Availabledata | <i>Available datasources</i> |
|---------------|------------------------------|

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**Description**

Availabledata contains a character vector with the names of the datasources that the package contains.

**Usage**

```
data("Availabledata")
```

**Format**

A character vector with the names of the datasources.

**Value**

character vector with the names of the datasources.

**Examples**

```
data(Availabledata)
cat(Availabledata)
```

---

|         |                                                  |
|---------|--------------------------------------------------|
| getData | <i>Datasource and underlying network loading</i> |
|---------|--------------------------------------------------|

---

## Description

Function to load a gene expression datasource and the network that have generate it.

## Usage

```
getData(datasource.name=NULL, getNet=TRUE)
```

## Arguments

|                 |                                                                                       |
|-----------------|---------------------------------------------------------------------------------------|
| datasource.name | A character containing the name of network datasources to (default: NULL).            |
| getNet          | Logical specifying if the true underlying network should be returned (default: TRUE). |

## Details

If getNet is TRUE the function will return a list with two components:

1. A data.frame with the specified datasoruce.
2. A matrix with the true underlying network.

## Value

The function getData loads the specified datasource by datasource.name and its true underlying network if it is specified by getNet.

## Examples

```
# Get only datasource
data <- getData(datasource.name="syntren300", getNet=FALSE)
# Get the datasource and network in a list
mydata <- getData(datasource.name="syntren1000")
data <- mydata[[1]]
net <- mydata[[2]]
```

---

`gnw1565.data`*Simulated Gene Expression Data*

---

**Description**

Dataset containing 1565 samples and 1565 genes generated by the publicly available GNW generator using an *ecoli* source network with no added noise.

**Usage**

```
data(gnw1565.data)
```

**Format**

`gnw1565.data` is a data frame containing 1565 rows and 1565 columns. Each row contains a simulated microarray experiment and each column contains a gene. The dataset was generated with GNW generator which relies on ODEs for modeling gene regulation.

**Value**

`data.frame` containing the data.

**Source**

GNW v3.1 with source network : *Ecoli*

**References**

Schaffter, Thomas, Daniel Marbach, and Dario Floreano. "GeneNetWeaver: in silico benchmark generation and performance profiling of network inference methods." *Bioinformatics* 27.16 (2011): 2263-2270.

**See Also**

[gnw1565.net](#), [gnw2000.data](#), [rogers1000.data](#), [syntren300.data](#), [syntren1000.data](#)

**Examples**

```
data(gnw1565.data)
# Print size
print(dim(gnw1565.data))
```

---

gnw1565.net*Simulated Gene Expression Data*

---

**Description**

True underlying network used to generate the dataset at [gnw1565.data](#).

**Usage**

```
data(gnw1565.net)
```

**Format**

true.net is the true underlying network used to generate the dataset loaded at [gnw1565.data](#).

**Value**

matrix containg underlying network.

**Source**

GNW v3.1 with source network : Ecoli

**References**

Schaffter, Thomas, Daniel Marbach, and Dario Floreano. "GeneNetWeaver: in silico benchmark generation and performance profiling of network inference methods." *Bioinformatics* 27.16 (2011): 2263-2270.

**See Also**

[gnw1565.data](#), [gnw2000.data](#), [rogers1000.data](#), [syntren300.data](#), [syntren1000.data](#)

**Examples**

```
data(gnw1565.net)
# Number of directed edges
nEdges<- sum(gnw1565.net)
```

---

`gnw2000.data`*Simulated Gene Expression Data*

---

**Description**

Dataset containing 2000 samples and 2000 genes generated by the publicly available GNW generator using a yeast source network with no added noise.

**Usage**

```
data(gnw2000.data)
```

**Format**

`gnw2000.data` is a data frame containing 2000 rows and 2000 columns. Each row contains a simulated microarray experiment and each column contains a gene. The dataset was generated with GNW generator which relies on ODEs for modeling gene regulation.

**Value**

`data.frame` containing the data.

**Source**

GNW v3.1 with source network : Yeast

**References**

Schaffter, Thomas, Daniel Marbach, and Dario Floreano. "GeneNetWeaver: in silico benchmark generation and performance profiling of network inference methods." *Bioinformatics* 27.16 (2011): 2263-2270.

**See Also**

[gnw2000.net](#), [gnw1565.data](#), [rogers1000.data](#), [syntren300.data](#), [syntren1000.data](#)

**Examples**

```
data(gnw2000.data)
# Print size
print(dim(gnw2000.data))
```

---

gnw2000.net*Simulated Gene Expression Data*

---

**Description**

True underlying network used to generate the dataset at [gnw2000.data](#).

**Usage**

```
data(gnw2000.net)
```

**Format**

true.net is the true underlying network used to generate the dataset loaded at [gnw2000.data](#).

**Value**

matrix containg underlying network.

**Source**

GNW v3.1 with source network : Yeast

**References**

Schaffter, Thomas, Daniel Marbach, and Dario Floreano. "GeneNetWeaver: in silico benchmark generation and performance profiling of network inference methods." *Bioinformatics* 27.16 (2011): 2263-2270.

**See Also**

[gnw2000.data](#), [gnw1565.data](#), [rogers1000.data](#), [syntren300.data](#), [syntren1000.data](#)

**Examples**

```
data(gnw2000.net)
# Number of directed edges
nEdges<- sum(gnw2000.net)
```

---

`rogers1000.data`*Simulated Gene Expression Data*

---

**Description**

Dataset containing 1000 samples and 1000 genes generated by the publicly available generator using a power-law tail topology network with no added noise.

**Usage**

```
data(rogers1000.data)
```

**Format**

`rogers1000.data` is a data frame containing 1000 rows and 1000 columns. Each row contains a simulated microarray experiment and each column contains a gene.

**Value**

data.frame containing the data.

**Source**

sRogers with Power-law tail topology

**References**

Rogers, Simon, and Mark Girolami. "A Bayesian regression approach to the inference of regulatory networks from gene expression data." *Bioinformatics* 21.14 (2005): 3131-3137.

**See Also**

[rogers1000.net](#), [gnw1565.data](#), [gnw2000.data](#), [syntren300.data](#), [syntren1000.data](#)

**Examples**

```
data(rogers1000.data)
# Print size
print(dim(rogers1000.data))
```



---

|                |                                       |
|----------------|---------------------------------------|
| rogers1000.net | <i>Simulated Gene Expression Data</i> |
|----------------|---------------------------------------|

---

**Description**

True underlying network used to generate the dataset at [rogers1000.data](#).

**Usage**

```
data(rogers1000.net)
```

**Format**

true.net is the true underlying network used to generate the dataset loaded at [rogers1000.data](#).

**Value**

matrix containg underlying network.

**Source**

sRogers with Power-law tail topology

**References**

Rogers, Simon, and Mark Girolami. "A Bayesian regression approach to the inference of regulatory networks from gene expression data." *Bioinformatics* 21.14 (2005): 3131-3137.

**See Also**

[rogers1000.data](#), [gnw1565.data](#), [gnw2000.data](#), [syntren300.data](#), [syntren1000.data](#)

**Examples**

```
data(rogers1000.net)
# Number of directed edges
nEdges<- sum(rogers1000.net)
```

---

|                  |                                       |
|------------------|---------------------------------------|
| syntren1000.data | <i>Simulated Gene Expression Data</i> |
|------------------|---------------------------------------|

---

**Description**

Dataset containing 1000 samples and 1000 genes generated by the publicly available SynTReN generator using an ecoli source network.

**Usage**

```
data(syntren1000.data)
```

**Format**

syntren1000.data is a data frame containing 1000 rows and 1000 columns. Each row contains a simulated microarray experiment and each column contains a gene.

**Value**

data.frame containing the data.

**Source**

SynTReN 1.1.3 with source network : ecoli\\_nn.sif

**References**

Van den Bulcke, Tim, et al. "SynTReN: a generator of synthetic gene expression data for design and analysis of structure learning algorithms." BMC Bioinformatics 7.1 (2006): 43.

**See Also**

[gnw1565.data](#), [gnw2000.data](#), [rogers1000.data](#), [syntren300.data](#)

**Examples**

```
data(syntren1000.data)
# Print size
print(dim(syntren1000.data))
```

---

|                 |                                       |
|-----------------|---------------------------------------|
| syntren1000.net | <i>Simulated Gene Expression Data</i> |
|-----------------|---------------------------------------|

---

**Description**

True underlying network used to generate the dataset at [syntren1000.data](#).

**Usage**

```
data(syntren1000.net)
```

**Format**

syntren1000.net is the true underlying network used to generate the dataset loaded at [syntren1000.data](#).

**Value**

matrix containg underlying network.

**Source**

SynTReN 1.1.3 with source network : `ecoli_nn.sif`

**References**

Van den Bulcke, Tim, et al. "SynTReN: a generator of synthetic gene expression data for design and analysis of structure learning algorithms." *BMC Bioinformatics* 7.1 (2006): 43.

**See Also**

[syntren1000.data](#), [gnw1565.data](#), [gnw2000.data](#), [rogers1000.data](#), [syntren300.data](#)

**Examples**

```
data(syntren1000.net)
# Number of directed edges
nEdges<- sum(syntren1000.net)
```

---

|                 |                                       |
|-----------------|---------------------------------------|
| syntren300.data | <i>Simulated Gene Expression Data</i> |
|-----------------|---------------------------------------|

---

**Description**

Dataset containing 800 samples and 300 genes generated by the publicly available SynTReN generator using an ecoli source network.

**Usage**

```
data(syntren300.data)
```

**Format**

syntren300.data is a data frame containing 800 rows and 300 columns. Each row contains a simulated microarray experiment and each column contains a gene.

**Value**

data.frame containing the data.

**Source**

SynTReN 1.1.3 with source network : ecoli\\_nn.sif

**References**

Van den Bulcke, Tim, et al. "SynTReN: a generator of synthetic gene expression data for design and analysis of structure learning algorithms." BMC Bioinformatics 7.1 (2006): 43.

**See Also**

[syntren300.net](#), [syntren1000.data](#), [rogers1000.data](#), [gnw1565.data](#), [gnw2000.data](#)

**Examples**

```
data(syntren300.data)
# Print size
print(dim(syntren300.data))
```

---

|                |                                       |
|----------------|---------------------------------------|
| syntren300.net | <i>Simulated Gene Expression Data</i> |
|----------------|---------------------------------------|

---

**Description**

True underlying network used to generate the dataset at [syntren300.data](#).

**Usage**

```
data(syntren300.net)
```

**Format**

true.net is the true underlying network used to generate the dataset loaded at [syntren300.data](#).

**Value**

matrix containg underlying network.

**Source**

SynTReN 1.1.3 with source network : ecoli\_nn.sif

**References**

Van den Bulcke, Tim, et al. "SynTReN: a generator of synthetic gene expression data for design and analysis of structure learning algorithms." BMC bioinformatics 7.1 (2006): 43.

**See Also**

[syntren300.data](#), [syntren1000.data](#), [rogers1000.data](#), [gnw1565.data](#), [gnw2000.data](#)

**Examples**

```
data(syntren300.net)
# Number of directed edges
nEdges<-sum(syntren300.net)
```

---

`toy.data`*Simulated Toy example of Gene Expression Data*

---

**Description**

Dataset containing 64 samples and 64 genes generated by the publicly available GNW generator using an ecoli source network.

**Usage**

```
data(toy.data)
```

**Format**

`toy.data` is a data frame containing 64 rows and 64 columns. Each row contains a simulated microarray experiment and each column contains a gene.

**Value**

data.frame containg the data.

**Source**

GNW v3.1 with source network : Example (Ecoli)

**References**

Schaffter, Thomas, Daniel Marbach, and Dario Floreano. "GeneNetWeaver: in silico benchmark generation and performance profiling of network inference methods." *Bioinformatics* 27.16 (2011): 2263-2270.

**See Also**

[toy.net](#)

**Examples**

```
data(toy.data)
# Print size
print(dim(toy.data))
```

---

toy.net*Simulated Toy example of Gene Expression Data*

---

**Description**

True underlying network used to generate the dataset at [toy.data](#).

**Usage**

```
data(toy.net)
```

**Format**

toy.net is the true underlying network used to generate the dataset loaded at [toy.data](#).

**Value**

matrix containg underlying network.

**Source**

GNW v3.1 with source network : Example (Ecoli)

**References**

Schaffter, Thomas, Daniel Marbach, and Dario Floreano. "GeneNetWeaver: in silico benchmark generation and performance profiling of network inference methods." *Bioinformatics* 27.16 (2011): 2263-2270.

**See Also**

[toy.data](#)

**Examples**

```
data(toy.net)
# Print size
nEdges<- sum(toy.net)
```

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