

# Package ‘NCIgraph’

September 25, 2024

**Title** Pathways from the NCI Pathways Database

**Version** 1.53.0

**Date** 2012-04-27

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**Description** Provides various methods to load the pathways from the NCI Pathways Database in R graph objects and to re-format them.

**License** GPL-3

**LazyLoad** yes

**Imports** graph, KEGGgraph, methods, RBGL, RCy3, R.oo

**Depends** R (>= 4.0.0)

**Suggests** Rgraphviz

**Enhances** DEGraph

**biocViews** Pathways, GraphAndNetwork

**git\_url** <https://git.bioconductor.org/packages/NCIgraph>

**git\_branch** devel

**git\_last\_commit** be43d65

**git\_last\_commit\_date** 2024-04-30

**Repository** Bioconductor 3.20

**Date/Publication** 2024-09-24

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directedBFS *Uses a breadth first search on a directed graph to identify which genes are regulated by a particular node in the graph*

---

**Description**

Uses a breadth first search on a directed graph to identify which genes are regulated by a particular node in the graph.

**Usage**

```
directedBFS(g, node)
```

**Arguments**

g                    A [graph](#) object.  
node                A node of g.

**Value**

A structured [list](#) containing the regulated genes and the type of interaction between node and each gene.

**Author(s)**

Laurent Jacob

**See Also**

[propagateRegulation\(\)](#)

---

edgesToMerge *Identifies edges that should be merged to parse a NCI network*

---

**Description**

Identifies edges that should be merged to parse a NCI network.

**Usage**

```
edgesToMerge(g)
```

**Arguments**

g                    A [graph](#) object.

**Value**

A [list](#) of edges to be merged

**Author(s)**

Laurent Jacob

**See Also**[parseNCInetwork\(\)](#)

---

`getNCIPathways`*Loads networks from Cytoscape and parses them*

---

**Description**

Loads networks from Cytoscape and parses them.

**Usage**`getNCIPathways(cyList=NULL, parseNetworks=TRUE, entrezOnly=TRUE, verbose=FALSE)`**Arguments**

`cyList` a [list](#) providing the networks loaded from Cytoscape. If `NULL`, the function will try to build the [list](#) from Cytoscape.

`verbose` If `TRUE`, extra information is output.

`parseNetworks` A [logical](#). If `FALSE`, the raw NCI networks are returned as `graphNEL` objects. If `TRUE`, some additional parsing is performed by the `parseNCInetwork` function.

`entrezOnly` A [logical](#). If `TRUE`, only keep nodes with an `entrezID` property.

**Value**A [list](#) of two elements: `pList`, a [list](#) of `graphNEL` objects, and `failedW` a [list](#) containing the names of the networks that R failed to read from cytoscape.**Author(s)**

Laurent Jacob

**See Also**[parseNCInetwork\(\)](#)**Examples**

```
##-----
## Load NCIGraph
##-----

library(NCIGraph)

##-----
## Example 1: with Cytoscape
##-----
```

```

## Must have Cytoscape running with some networks open and CyREST plugin started.

## In this case, getNCIPathways will both read the raw networks from Cytoscape and parse them.

## Not run:
grList <- getNCIPathways(cyList=NULL, parseNetworks=TRUE, entrezOnly=TRUE, verbose=TRUE)$pList

## End(Not run)

##-----
## Example 2: without Cytoscape
##-----

## Get some raw networks

data("NCIgraphVignette", package="NCIgraph")

## When passed a non null cyList argument (a list of networks),
## getNCIPathways will simply parse the list of networks

grList <- getNCIPathways(cyList=NCI.demo.cyList, parseNetworks=TRUE, entrezOnly=TRUE, verbose=TRUE)$pList

```

---

getSubtype.NCIgraph     *Returns a list of @KEGGEdgeSubType objects describing each edge of the NCI network*

---

### Description

Returns a list of @KEGGEdgeSubType objects describing each edge of the NCI network.

### Usage

```
getSubtype.NCIgraph(object)
```

### Arguments

object                An [NCIgraph](#) object.

### Value

A [list](#) of KEGGEdgeSubType objects.

### Author(s)

Laurent Jacob

### Examples

```

##-----
## Load NCIgraph
##-----

library(NCIgraph)

```

```
##-----  
## Get some raw networks  
##-----  
  
data("NCIgraphVignette", package="NCIgraph")  
  
##-----  
## Parse them  
##-----  
  
grList <- getNCIPathways(cyList=NCI.demo.cyList, parseNetworks=TRUE, entrezOnly=TRUE, verbose=TRUE)$pList  
  
##-----  
##  
## Get the subtype of the second network. Some activation and some  
## inhibition edges.  
##  
##-----  
  
getSubtype.NCIgraph(grList[[2]])
```

---

is.NCIgraph

*Assess whether a graph is a NCI graph*

---

## Description

Assess whether a graph is a NCI graph.

## Usage

```
is.NCIgraph(gr)
```

## Arguments

`gr` A [graph](#) object.

## Value

A [logical](#), [TRUE](#) if the graph is a NCI graph, [FALSE](#) otherwise.

## Author(s)

Laurent Jacob

## See Also

[parseNCInetwork\(\)](#)

---

mergeNodes	<i>Merges a given list of nodes in a graph</i>
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**Description**

Merges a given list of nodes in a graph.

**Usage**

```
mergeNodes(g, mEdges, separateEntrez=TRUE, entrezOnly=TRUE)
```

**Arguments**

`g` A [graph](#) object.  
`mEdges` A [list](#) of nodes to be merged.  
`separateEntrez` A [logical](#). If `TRUE`, don't merge two nodes with entrezID.  
`entrezOnly` A [logical](#). If `TRUE`, only keep nodes with an entrezID property.

**Value**

The updated [graph](#) object

**Author(s)**

Laurent Jacob

**See Also**

[parseNCInetwork\(\)](#)

---

NCI.demo.cyList	<i>10 raw NCI networks from Nature curated pathways and BioCarta imported as graphNEL objects, for demonstration purpose</i>
-----------------	------------------------------------------------------------------------------------------------------------------------------

---

**Description**

These are the ten first elements of the full list of raw networks that can be downloaded using the `downloadCyLists.R` script.

**Usage**

```
NCI.demo.cyList
```

**Format**

A list of 10 graphNEL objects.

**Author(s)**

Laurent Jacob

**Examples**

```
data("NCIgraphVignette")
length(NCI.demo.cyList)

library(Rgraphviz)
plot(NCI.demo.cyList[[1]])
```

NCIgraph

*Class NCIgraph***Description**

Package: NCIgraph  
**Class NCIgraph**

public static class **NCIgraph**  
 extends graphNELObject

Class extending graphNEL fro graphs build from NCI gene networks.

**Author(s)**

Laurent Jacob

parseNCInetwork

*Takes a NCI network and transforms it into a simpler graph only representing inhibition/activation relationships between genes*

**Description**

Takes a NCI network and transforms it into a simpler graph only representing inhibition/activation relationships between genes.

**Usage**

```
parseNCInetwork(g, propagateReg=TRUE, separateEntrez=TRUE, mergeEntrezCopies=TRUE, entrezOnly=TRUE)
```

**Arguments**

**g** A [graph](#) object.

**propagateReg** A [logical](#). If [TRUE](#), use propagateRegulation to transform the network before parsing it.

**separateEntrez** A [logical](#). If [TRUE](#), don't merge two nodes with entrezID.

**mergeEntrezCopies** A [logical](#). If [TRUE](#), merge resulting nodes that have the same entrezID.

**entrezOnly** A [logical](#). If [TRUE](#), only keep nodes with an entrezID property.

**Value**

The new [graph](#) object.

**Author(s)**

Laurent Jacob

**Examples**

```
## Load NCIGraph
library(NCIGraph)

## Get some raw networks
data("NCIGraphVignette", package="NCIGraph")

## Parse the first of them

parsedNetwork <- parseNCInetwork(NCI.demo.cyList[[1]],propagateReg=TRUE,separateEntrez=TRUE,mergeEntrezCopi
```

---

propagateRegulation	<i>Transforms the network in a way that each Biochemical Reaction node pointing to a Complex points to what is regulated by the complex and updates the interaction types accordingly</i>
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---

**Description**

Transforms the network in a way that each Biochemical Reaction node pointing to a Complex points to what is regulated by the complex and updates the interaction types accordingly.

**Usage**

```
propagateRegulation(g)
```

**Arguments**

`g` A [graph](#) object.

**Value**

The updated [graph](#) object

**Author(s)**

Laurent Jacob

**See Also**

[parseNCInetwork\(\)](#)

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translateNCI2GeneID    *Gives the entrezID corresponding to the nodes of a graph*

---

**Description**

Gives the entrezID corresponding to the nodes of a graph.

**Usage**

```
translateNCI2GeneID(g)
```

**Arguments**

`g`                    A [graph](#) object.

**Value**

A vector of [character](#) giving the entrez ID of the nodes of `g`.

**Author(s)**

Laurent Jacob

**See Also**

[parseNCInetwork\(\)](#)

**Examples**

```
##-----  
## Load NCIgraph  
##-----  
  
library(NCIgraph)  
  
## Get some raw networks  
  
data("NCIgraphVignette", package="NCIgraph")  
  
## Parse them  
  
grList <- getNCIPathways(cyList=NCI.demo.cyList, parseNetworks=TRUE, entrezOnly=TRUE, verbose=TRUE)$pList  
  
## Get the gene ids for the first of them  
  
gids <- translateNCI2GeneID(grList[[1]])
```

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