

# Package ‘DOSE’

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**Type** Package

**Title** Disease Ontology Semantic and Enrichment analysis

**Version** 4.4.0

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**Description** This package implements five methods proposed by Resnik, Schlicker, Jiang, Lin and Wang respectively for measuring semantic similarities among DO terms and gene products. Enrichment analyses including hypergeometric model and gene set enrichment analysis are also implemented for discovering disease associations of high-throughput biological data.

**Depends** R (>= 3.5.0)

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**BugReports** <https://github.com/GuangchuangYu/DOSE/issues>

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DOSE-package

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*DOSE: Disease Ontology Semantic and Enrichment analysis*


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## Description

This package implements five methods proposed by Resnik, Schlicker, Jiang, Lin and Wang respectively for measuring semantic similarities among DO terms and gene products. Enrichment analyses including hypergeometric model and gene set enrichment analysis are also implemented for discovering disease associations of high-throughput biological data.

**Author(s)**

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**See Also**

Useful links:

- <https://yulab-smu.top/biomedical-knowledge-mining-book/>
- Report bugs at <https://github.com/GuangchuangYu/DOSE/issues>

---

clusterSim

*clusterSim*

---

**Description**

semantic similarity between two gene clusters

**Usage**

```
clusterSim(  
  cluster1,  
  cluster2,  
  ont = "HDO",  
  organism = "hsa",  
  measure = "Wang",  
  combine = "BMA"  
)
```

**Arguments**

|          |                                                            |
|----------|------------------------------------------------------------|
| cluster1 | a vector of gene IDs                                       |
| cluster2 | another vector of gene IDs                                 |
| ont      | one of "HDO", "HPO" and "MPO"                              |
| organism | one of "hsa" and "mmu"                                     |
| measure  | One of "Resnik", "Lin", "Rel", "Jiang" and "Wang" methods. |
| combine  | One of "max", "avg", "rcmax", "BMA" methods, for combining |

**Details**

given two gene clusters, this function calculates semantic similarity between them.

**Value**

similarity

**Author(s)**

Yu Guangchuang

**Examples**

```
## Not run:
cluster1 <- c("835", "5261", "241", "994")
cluster2 <- c("307", "308", "317", "321", "506", "540", "378", "388", "396")
clusterSim(cluster1, cluster2)

## End(Not run)
```

---

compareClusterResult-class

*Class "compareClusterResult" This class represents the comparison result of gene clusters by GO categories at specific level or GO enrichment analysis.*

---

**Description**

Class "compareClusterResult" This class represents the comparison result of gene clusters by GO categories at specific level or GO enrichment analysis.

**Slots**

compareClusterResult cluster comparing result  
geneClusters a list of genes  
fun one of groupGO, enrichGO and enrichKEGG  
gene2Symbol gene ID to Symbol  
keytype Gene ID type  
readable logical flag of gene ID in symbol or not.  
.call function call  
termsim Similarity between term  
method method of calculating the similarity between nodes  
dr dimension reduction result

**Author(s)**

Guangchuang Yu <https://yulab-smu.top>

**See Also**

[enrichResult](#)

---

|           |                                    |
|-----------|------------------------------------|
| computeIC | <i>compute information content</i> |
|-----------|------------------------------------|

---

**Description**

compute information content

**Usage**

```
computeIC(ont = "HDO")
```

**Arguments**

ont                      one of "DO", "HPO" and "MPO"

**Author(s)**

Guangchuang Yu <https://yulab-smu.top>

---

|         |                 |
|---------|-----------------|
| DataSet | <i>Datasets</i> |
|---------|-----------------|

---

**Description**

Information content and DO term to entrez gene IDs mapping

---

|         |                |
|---------|----------------|
| doseSim | <i>doseSim</i> |
|---------|----------------|

---

**Description**

measuring similarities between two DO term vectors.

**Usage**

```
doseSim(DO1D1, DO1D2, measure = "Wang", ont = "HDO")
```

```
doSim(DO1D1, DO1D2, measure = "Wang", ont = "HDO")
```

**Arguments**

|         |                                                             |
|---------|-------------------------------------------------------------|
| DO1D1   | DO term, MPO term or HPO term vector                        |
| DO1D2   | DO term, MPO term or HPO term vector                        |
| measure | one of "Wang", "Resnik", "Rel", "Jiang", "Lin", and "TCSS". |
| ont     | one of "HDO", "HPO" and "MPO"                               |

**Details**

provide two term vectors, this function will calculate their similarities.

**Value**

score matrix

**Author(s)**

Guangchuang Yu <https://yulab-smu.top>

---

|           |                                                                                                                      |
|-----------|----------------------------------------------------------------------------------------------------------------------|
| enrichDGN | <i>Enrichment analysis based on the DisGeNET</i> ( <a href="http://www.disgenet.org/">http://www.disgenet.org/</a> ) |
|-----------|----------------------------------------------------------------------------------------------------------------------|

---

**Description**

given a vector of genes, this function will return the enrichment NCG categories with FDR control

**Usage**

```
enrichDGN(
  gene,
  pvalueCutoff = 0.05,
  pAdjustMethod = "BH",
  universe,
  minGSSize = 10,
  maxGSSize = 500,
  qvalueCutoff = 0.2,
  readable = FALSE
)
```

**Arguments**

|               |                                                                              |
|---------------|------------------------------------------------------------------------------|
| gene          | a vector of entrez gene id                                                   |
| pvalueCutoff  | pvalue cutoff                                                                |
| pAdjustMethod | one of "holm", "hochberg", "hommel", "bonferroni", "BH", "BY", "fdr", "none" |
| universe      | background genes                                                             |
| minGSSize     | minimal size of genes annotated by NCG category for testing                  |
| maxGSSize     | maximal size of each geneSet for analyzing                                   |
| qvalueCutoff  | qvalue cutoff                                                                |
| readable      | whether mapping gene ID to gene Name                                         |

**Value**

A enrichResult instance

**Author(s)**

Guangchuang Yu

## References

Janet et al. (2015) DisGeNET: a discovery platform for the dynamical exploration of human diseases and their genes. *Database* bav028 <http://database.oxfordjournals.org/content/2015/bav028.long>

---

|            |                  |
|------------|------------------|
| enrichDGNv | <i>enrichDGN</i> |
|------------|------------------|

---

## Description

Enrichment analysis based on the DisGeNET (<http://www.disgenet.org/>)

## Usage

```
enrichDGNv(  
  snp,  
  pvalueCutoff = 0.05,  
  pAdjustMethod = "BH",  
  universe,  
  minGSSize = 10,  
  maxGSSize = 500,  
  qvalueCutoff = 0.2,  
  readable = FALSE  
)
```

## Arguments

|               |                                                                              |
|---------------|------------------------------------------------------------------------------|
| snp           | a vector of SNP                                                              |
| pvalueCutoff  | pvalue cutoff                                                                |
| pAdjustMethod | one of "holm", "hochberg", "hommel", "bonferroni", "BH", "BY", "fdr", "none" |
| universe      | background genes                                                             |
| minGSSize     | minimal size of genes annotated by NCG category for testing                  |
| maxGSSize     | maximal size of each geneSet for analyzing                                   |
| qvalueCutoff  | qvalue cutoff                                                                |
| readable      | whether mapping gene ID to gene Name                                         |

## Details

given a vector of genes, this function will return the enrichment NCG categories with FDR control

## Value

A `enrichResult` instance

## Author(s)

Guangchuang Yu

## References

Janet et al. (2015) DisGeNET: a discovery platform for the dynamical exploration of human diseases and their genes. *Database* bav028 <http://database.oxfordjournals.org/content/2015/bav028.long>

---

enrichDO

*DO Enrichment Analysis*


---

## Description

Given a vector of genes, this function will return the enrichment DO categories with FDR control.

## Usage

```
enrichDO(
  gene,
  ont = "HDO",
  organism = "hsa",
  pvalueCutoff = 0.05,
  pAdjustMethod = "BH",
  universe,
  minGSSize = 10,
  maxGSSize = 500,
  qvalueCutoff = 0.2,
  readable = FALSE
)
```

## Arguments

|               |                                                                              |
|---------------|------------------------------------------------------------------------------|
| gene          | a vector of entrez gene id                                                   |
| ont           | one of "HDO", "HPO" or "MPO".                                                |
| organism      | one of "hsa" and "mmu"                                                       |
| pvalueCutoff  | pvalue cutoff                                                                |
| pAdjustMethod | one of "holm", "hochberg", "hommel", "bonferroni", "BH", "BY", "fdr", "none" |
| universe      | background genes                                                             |
| minGSSize     | minimal size of genes annotated by NCG category for testing                  |
| maxGSSize     | maximal size of each geneSet for analyzing                                   |
| qvalueCutoff  | qvalue cutoff                                                                |
| readable      | whether mapping gene ID to gene Name                                         |

## Value

A enrichResult instance.

## Author(s)

Guangchuang Yu <https://yulab-smu.top>

**See Also**[enrichResult-class](#)**Examples**

```
data(geneList)
gene = names(geneList)[geneList > 1]
yy = enrichD0(gene, pvalueCutoff=0.05)
summary(yy)
```

---

|                   |                        |
|-------------------|------------------------|
| enricher_internal | <i>enrich.internal</i> |
|-------------------|------------------------|

---

**Description**

internal method for enrichment analysis

**Usage**

```
enricher_internal(
  gene,
  pvalueCutoff,
  pAdjustMethod = "BH",
  universe = NULL,
  minGSSize = 10,
  maxGSSize = 500,
  qvalueCutoff = 0.2,
  USER_DATA
)
```

**Arguments**

|               |                                                                                                                                                                                                |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| gene          | a vector of entrez gene id.                                                                                                                                                                    |
| pvalueCutoff  | Cutoff value of pvalue.                                                                                                                                                                        |
| pAdjustMethod | one of "holm", "hochberg", "hommel", "bonferroni", "BH", "BY", "fdr", "none"                                                                                                                   |
| universe      | background genes, default is the intersection of the 'universe' with genes that have annotations. Users can set 'options(enrichment_force_universe = TRUE)' to force the 'universe' untouched. |
| minGSSize     | minimal size of genes annotated by Ontology term for testing.                                                                                                                                  |
| maxGSSize     | maximal size of each geneSet for analyzing                                                                                                                                                     |
| qvalueCutoff  | cutoff of qvalue                                                                                                                                                                               |
| USER_DATA     | ontology information                                                                                                                                                                           |

**Details**

using the hypergeometric model

**Value**

A `enrichResult` instance.

**Author(s)**

Guangchuang Yu <https://yulab-smu.top>

---

|           |                  |
|-----------|------------------|
| enrichNCG | <i>enrichNCG</i> |
|-----------|------------------|

---

**Description**

Enrichment analysis based on the Network of Cancer Genes database (<http://ncg.kcl.ac.uk/>)

**Usage**

```
enrichNCG(
  gene,
  pvalueCutoff = 0.05,
  pAdjustMethod = "BH",
  universe,
  minGSSize = 10,
  maxGSSize = 500,
  qvalueCutoff = 0.2,
  readable = FALSE
)
```

**Arguments**

|                            |                                                                              |
|----------------------------|------------------------------------------------------------------------------|
| <code>gene</code>          | a vector of entrez gene id                                                   |
| <code>pvalueCutoff</code>  | pvalue cutoff                                                                |
| <code>pAdjustMethod</code> | one of "holm", "hochberg", "hommel", "bonferroni", "BH", "BY", "fdr", "none" |
| <code>universe</code>      | background genes                                                             |
| <code>minGSSize</code>     | minimal size of genes annotated by NCG category for testing                  |
| <code>maxGSSize</code>     | maximal size of each <code>geneSet</code> for analyzing                      |
| <code>qvalueCutoff</code>  | qvalue cutoff                                                                |
| <code>readable</code>      | whether mapping gene ID to gene Name                                         |

**Details**

given a vector of genes, this function will return the enrichment NCG categories with FDR control

**Value**

A `enrichResult` instance

**Author(s)**

Guangchuang Yu

---

|                    |                                                                                      |
|--------------------|--------------------------------------------------------------------------------------|
| enrichResult-class | <i>Class "enrichResult" This class represents the result of enrichment analysis.</i> |
|--------------------|--------------------------------------------------------------------------------------|

---

**Description**

Class "enrichResult" This class represents the result of enrichment analysis.

**Slots**

result enrichment analysis  
 pvalueCutoff pvalueCutoff  
 pAdjustMethod pvalue adjust method  
 qvalueCutoff qvalueCutoff  
 organism only "human" supported  
 ontology biological ontology  
 gene Gene IDs  
 keytype Gene ID type  
 universe background gene  
 gene2Symbol mapping gene to Symbol  
 geneSets gene sets  
 readable logical flag of gene ID in symbol or not.  
 termsim Similarity between term  
 method method of calculating the similarity between nodes  
 dr dimension reduction result

**Author(s)**

Guangchuang Yu <https://yulab-smu.top>

**See Also**

[enrichDO](#)

---

|            |                   |
|------------|-------------------|
| EXTID2NAME | <i>EXTID2NAME</i> |
|------------|-------------------|

---

**Description**

mapping gene ID to gene Symbol

**Usage**

```
EXTID2NAME(OrgDb, geneID, keytype)
```

**Arguments**

|         |                |
|---------|----------------|
| OrgDb   | OrgDb          |
| geneID  | entrez gene ID |
| keytype | keytype        |

**Value**

gene symbol

**Author(s)**

Guangchuang Yu <https://yulab-smu.top>

---

|         |                                    |
|---------|------------------------------------|
| gene2DO | <i>convert Gene ID to DO Terms</i> |
|---------|------------------------------------|

---

**Description**

provide gene ID, this function will convert to the corresponding DO Terms

**Usage**

```
gene2DO(gene, organism = "hsa", ont = "HDO")
```

**Arguments**

|          |                |
|----------|----------------|
| gene     | entrez gene ID |
| organism | organism       |
| ont      | ont            |

**Value**

DO Terms

**Author(s)**

Guangchuang Yu <https://yulab-smu.top>

---

|        |                       |
|--------|-----------------------|
| geneID | <i>geneID generic</i> |
|--------|-----------------------|

---

**Description**

geneID generic

**Usage**

```
geneID(x)
```

**Arguments**

x                      enrichResult object

**Value**

'geneID' return the 'geneID' column of the enriched result which can be converted to data.frame via 'as.data.frame'

**Examples**

```
data(geneList, package="DOSE")
de <- names(geneList)[1:100]
x <- enrichDO(de)
geneID(x)
```

---

|                |                               |
|----------------|-------------------------------|
| geneInCategory | <i>geneInCategory generic</i> |
|----------------|-------------------------------|

---

**Description**

geneInCategory generic

**Usage**

```
geneInCategory(x)
```

**Arguments**

x                      enrichResult

**Value**

'geneInCategory' return a list of genes, by splitting the input gene vector to enriched functional categories

**Examples**

```
data(geneList, package="DOSE")
de <- names(geneList)[1:100]
x <- enrichDO(de)
geneInCategory(x)
```

geneSim

*geneSim***Description**

measuring similarities bewteen two gene vectors.

**Usage**

```
geneSim(
  geneID1,
  geneID2 = NULL,
  ont = "HDO",
  organism = "hsa",
  measure = "Wang",
  combine = "BMA"
)
```

**Arguments**

|          |                                                                                                                                          |
|----------|------------------------------------------------------------------------------------------------------------------------------------------|
| geneID1  | entrez gene vector                                                                                                                       |
| geneID2  | entrez gene vector                                                                                                                       |
| ont      | one of "HDO" and "MPO"                                                                                                                   |
| organism | one of "hsa" and "mmu"                                                                                                                   |
| measure  | one of "Wang", "Resnik", "Rel", "Jiang", and "Lin".                                                                                      |
| combine  | One of "max", "avg", "rcmax", "BMA" methods, for combining semantic similarity scores of multiple DO terms associated with gene/protein. |

**Details**

provide two entrez gene vectors, this function will calculate their similarity.

**Value**

score matrix

**Author(s)**

Guangchuang Yu <https://yulab-smu.top>

**Examples**

```
g <- c("835", "5261", "241", "994")
geneSim(g)
```

---

|                  |                                                                             |
|------------------|-----------------------------------------------------------------------------|
| gseaResult-class | <i>Class "gseaResult" This class represents the result of GSEA analysis</i> |
|------------------|-----------------------------------------------------------------------------|

---

**Description**

Class "gseaResult" This class represents the result of GSEA analysis

**Slots**

result GSEA anaysis  
 organism organism  
 setType setType  
 geneSets geneSets  
 geneList order rank geneList  
 keytype ID type of gene  
 permScores permutation scores  
 params parameters  
 gene2Symbol gene ID to Symbol  
 readable whether convert gene ID to symbol  
 dr dimension reduction result

**Author(s)**

Guangchuang Yu <https://yulab-smu.top>

---

|               |                      |
|---------------|----------------------|
| GSEA_internal | <i>GSEA_internal</i> |
|---------------|----------------------|

---

**Description**

generic function for gene set enrichment analysis

**Usage**

```
GSEA_internal(
  geneList,
  exponent,
  minGSSize,
  maxGSSize,
  eps,
  pvalueCutoff,
  pAdjustMethod,
  verbose,
  seed = FALSE,
  USER_DATA,
  by = "fgsea",
  ...
)
```

**Arguments**

|               |                                                                             |
|---------------|-----------------------------------------------------------------------------|
| geneList      | order ranked geneList                                                       |
| exponent      | weight of each step                                                         |
| minGSSize     | minimal size of each geneSet for analyzing                                  |
| maxGSSize     | maximal size of each geneSet for analyzing                                  |
| eps           | This parameter sets the boundary for calculating the p value.               |
| pvalueCutoff  | p value Cutoff                                                              |
| pAdjustMethod | p value adjustment method                                                   |
| verbose       | print message or not                                                        |
| seed          | set seed inside the function to make result reproducible. FALSE by default. |
| USER_DATA     | annotation data                                                             |
| by            | one of 'fgsea' or 'DOSE'                                                    |
| ...           | other parameter                                                             |

**Value**

gseaResult object

**Author(s)**

Yu Guangchuang

---

gseDGN

*DisGeNET Gene Set Enrichment Analysis*

---

**Description**

perform gsea analysis

**Usage**

```
gseDGN(
  geneList,
  exponent = 1,
  minGSSize = 10,
  maxGSSize = 500,
  pvalueCutoff = 0.05,
  pAdjustMethod = "BH",
  verbose = TRUE,
  seed = FALSE,
  by = "fgsea",
  ...
)
```

**Arguments**

|               |                                            |
|---------------|--------------------------------------------|
| geneList      | order ranked geneList                      |
| exponent      | weight of each step                        |
| minGSSize     | minimal size of each geneSet for analyzing |
| maxGSSize     | maximal size of each geneSet for analyzing |
| pvalueCutoff  | pvalue Cutoff                              |
| pAdjustMethod | p value adjustment method                  |
| verbose       | print message or not                       |
| seed          | logical                                    |
| by            | one of 'fgsea' or 'DOSE'                   |
| ...           | other parameter                            |

**Value**

gseaResult object

**Author(s)**

Yu Guangchuang

---

gseDO

*DO Gene Set Enrichment Analysis*

---

**Description**

perform gsea analysis

**Usage**

```
gseDO(  
  geneList,  
  ont = "HDO",  
  organism = "hsa",  
  exponent = 1,  
  minGSSize = 10,  
  maxGSSize = 500,  
  pvalueCutoff = 0.05,  
  pAdjustMethod = "BH",  
  verbose = TRUE,  
  seed = FALSE,  
  by = "fgsea",  
  ...  
)
```

**Arguments**

|               |                                            |
|---------------|--------------------------------------------|
| geneList      | order ranked geneList                      |
| ont           | one of "HDO", "HPO" or "MPO"               |
| organism      | one of "hsa" and "mmu"                     |
| exponent      | weight of each step                        |
| minGSSize     | minimal size of each geneSet for analyzing |
| maxGSSize     | maximal size of each geneSet for analyzing |
| pvalueCutoff  | pvalue Cutoff                              |
| pAdjustMethod | p value adjustment method                  |
| verbose       | print message or not                       |
| seed          | logical                                    |
| by            | one of 'fgsea' or 'DOSE'                   |
| ...           | other parameter                            |

**Value**

gseaResult object

**Author(s)**

Yu Guangchuang

---

gseNCG

*NCG Gene Set Enrichment Analysis*

---

**Description**

perform gsea analysis

**Usage**

```
gseNCG(  
  geneList,  
  exponent = 1,  
  minGSSize = 10,  
  maxGSSize = 500,  
  pvalueCutoff = 0.05,  
  pAdjustMethod = "BH",  
  verbose = TRUE,  
  seed = FALSE,  
  by = "fgsea",  
  ...  
)
```

**Arguments**

|               |                                            |
|---------------|--------------------------------------------|
| geneList      | order ranked geneList                      |
| exponent      | weight of each step                        |
| minGSSize     | minimal size of each geneSet for analyzing |
| maxGSSize     | maximal size of each geneSet for analyzing |
| pvalueCutoff  | pvalue Cutoff                              |
| pAdjustMethod | p value adjustment method                  |
| verbose       | print message or not                       |
| seed          | logical                                    |
| by            | one of 'fgsea' or 'DOSE'                   |
| ...           | other parameter                            |

**Value**

gseaResult object

**Author(s)**

Yu Guangchuang

---

gsfilter

*gsfilter*


---

**Description**

filter enriched result by gene set size or gene count

**Usage**

```
gsfilter(x, by = "GSSize", min = NA, max = NA)
```

**Arguments**

|     |                                                  |
|-----|--------------------------------------------------|
| x   | instance of enrichResult or compareClusterResult |
| by  | one of 'GSSize' or 'Count'                       |
| min | minimal size                                     |
| max | maximal size                                     |

**Value**

update object

**Author(s)**

Guangchuang Yu

---

mclusterSim

*mclusterSim*


---

## Description

Pairwise semantic similarity for a list of gene clusters

## Usage

```
mclusterSim(
  clusters,
  ont = "HDO",
  organism = "hsa",
  measure = "Wang",
  combine = "BMA"
)
```

## Arguments

|          |                                                                                                                                          |
|----------|------------------------------------------------------------------------------------------------------------------------------------------|
| clusters | A list of gene clusters                                                                                                                  |
| ont      | one of "HDO", "HPO" and "MPO"                                                                                                            |
| organism | organism                                                                                                                                 |
| measure  | one of "Wang", "Resnik", "Rel", "Jiang", and "Lin".                                                                                      |
| combine  | One of "max", "avg", "rcmax", "BMA" methods, for combining semantic similarity scores of multiple DO terms associated with gene/protein. |

## Value

similarity matrix

## Author(s)

Guangchuang Yu

## Examples

```
## Not run:
cluster1 <- c("835", "5261", "241")
cluster2 <- c("578", "582")
cluster3 <- c("307", "308", "317")
clusters <- list(a=cluster1, b=cluster2, c=cluster3)
mclusterSim(clusters, measure="Wang")

## End(Not run)
```

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|             |                    |
|-------------|--------------------|
| parse_ratio | <i>parse_ratio</i> |
|-------------|--------------------|

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**Description**

parse character ratio to double value, such as 1/5 to 0.2

**Usage**

```
parse_ratio(ratio)
```

**Arguments**

|       |                                    |
|-------|------------------------------------|
| ratio | character vector of ratio to parse |
|-------|------------------------------------|

**Value**

A numeric vector (double) of parsed ratio

**Author(s)**

Guangchuang Yu

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|           |                                             |
|-----------|---------------------------------------------|
| reexports | <i>Objects exported from other packages</i> |
|-----------|---------------------------------------------|

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**Description**

These objects are imported from other packages. Follow the links below to see their documentation.

**ggplot2** [facet\\_grid](#)

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|             |                    |
|-------------|--------------------|
| setReadable | <i>setReadable</i> |
|-------------|--------------------|

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**Description**

mapping geneID to gene Symbol

**Usage**

```
setReadable(x, OrgDb, keyType = "auto")
```

**Arguments**

|         |                     |
|---------|---------------------|
| x       | enrichResult Object |
| OrgDb   | OrgDb               |
| keyType | keyType of gene     |

**Value**

enrichResult Object

**Author(s)**

Yu Guangchuang

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|      |                    |
|------|--------------------|
| show | <i>show method</i> |
|------|--------------------|

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**Description**

show method for gseaResult instance  
show method for enrichResult instance

**Usage**

show(object)  
show(object)

**Arguments**

object            A enrichResult instance.

**Value**

message  
message

**Author(s)**

Guangchuang Yu <https://yulab-smu.top>

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|         |                |
|---------|----------------|
| simplot | <i>simplot</i> |
|---------|----------------|

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**Description**

plotting similarity matrix

**Usage**

```
simplot(  
  sim,  
  xlab = "",  
  ylab = "",  
  color.low = "white",  
  color.high = "red",  
  labs = TRUE,  
  digits = 2,  
  labs.size = 3,  
  font.size = 14  
)
```

**Arguments**

|            |                                |
|------------|--------------------------------|
| sim        | similarity matrix              |
| xlab       | xlab                           |
| ylab       | ylab                           |
| color.low  | color of low value             |
| color.high | color of high value            |
| labs       | logical, add text label or not |
| digits     | round digit numbers            |
| labs.size  | lable size                     |
| font.size  | font size                      |

**Value**

ggplot object

**Author(s)**

Yu Guangchuang

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|         |                       |
|---------|-----------------------|
| summary | <i>summary method</i> |
|---------|-----------------------|

---

**Description**

summary method for gseaResult instance  
summary method for enrichResult instance

**Usage**

```
summary(object, ...)  
  
summary(object, ...)
```

**Arguments**

|        |                          |
|--------|--------------------------|
| object | A enrichResult instance. |
| ...    | additional parameter     |

**Value**

A data frame  
A data frame

**Author(s)**

Guangchuang Yu <https://guangchuangyu.github.io>  
Guangchuang Yu <http://guangchuangyu.github.io>

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|            |                   |
|------------|-------------------|
| theme_dose | <i>theme_dose</i> |
|------------|-------------------|

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**Description**

ggplot theme of DOSE

**Usage**

```
theme_dose(font.size = 14)
```

**Arguments**

|           |           |
|-----------|-----------|
| font.size | font size |
|-----------|-----------|

**Value**

ggplot theme

**Examples**

```
library(ggplot2)  
qplot(1:10) + theme_dose()
```

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