

# Package ‘TaxSEA’

April 6, 2026

**Type** Package

**Title** Taxon Set Enrichment Analysis

**Version** 1.2.0

**Description** TaxSEA is an R package for Taxon Set Enrichment Analysis, which utilises a Kolmogorov-Smirnov test analyses to investigate differential abundance analysis output for whether there are alternations in a-priori defined sets of taxa from public databases (BugSigDB, MiMeDB, GutMGene, mBodyMap, BacDive and GMRepoV2) and collated from the literature. TaxSEA takes as input a list of taxonomic identifiers (e.g. species names, NCBI IDs etc.) and a rank (E.g. fold change, correlation coefficient). TaxSEA be applied to any microbiota taxonomic profiling technology (array-based, 16S rRNA gene sequencing, shotgun metagenomics & metatranscriptomics etc.) and enables researchers to rapidly contextualize their findings within the broader literature to accelerate interpretation of results.

**License** GPL-3

**Encoding** UTF-8

**LazyData** false

**VignetteBuilder** knitr

**RoxygenNote** 7.3.2

**biocViews** Microbiome, Metagenomics, Sequencing, GeneSetEnrichment, RNASeq

**URL** <https://github.com/feargalr/taxsea>

**BugReports** <https://github.com/feargalr/taxsea/issues>

**Depends** R (>= 4.5.0)

**Suggests** BiocStyle, bugsigdbr, fgsea, knitr, rmarkdown, testthat

**Imports** stats, utils

**Config/testthat/edition** 3

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**Author** Feargal Ryan [aut, cre] (ORCID:  
<<https://orcid.org/0000-0002-1565-4598>>)

**Maintainer** Feargal Ryan <feargalr@gmail.com>

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get_ncbi_taxon_ids	<i>Retrieve NCBI Taxonomy IDs for a list of taxon names</i>
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## Description

This function takes a vector of taxon names and returns a vector of NCBI taxonomy IDs by querying the NCBI Entrez API.

## Usage

```
get_ncbi_taxon_ids(taxon_names)
```

## Arguments

taxon\_names      A character vector of taxon names

## Value

A character vector of NCBI taxonomy IDs corresponding to the input taxon names

## Examples

```
taxon_names <- c("Escherichia coli", "Staphylococcus aureus")
taxon_ids <- get_ncbi_taxon_ids(taxon_names)
```

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get_taxon_sets	<i>Retrieve Taxon Sets from TaxSEA Library</i>
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**Description**

Retrieve from the TaxSEA database which taxon sets (metabolite producers and disease signatures) contain a taxon of interest.

**Usage**

```
get_taxon_sets(taxon_to_fetch = taxon)
```

**Arguments**

taxon\_to\_fetch The taxon to search for in the TaxSEA database.

**Value**

A character vector containing the names of taxonomic sets where the specified taxon is present.

**Examples**

```
# Retrieve sets for Bifidobacterium longum  
get_taxon_sets(taxon="Bifidobacterium_longum")
```

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NCBI_ids	<i>NCBI IDs Dataset</i>
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**Description**

A dataset for mapping NCBI IDs to species/genus names. This named vector allows for lookup of NCBI IDs associated with species or genus names.

**Usage**

```
NCBI_ids
```

**Format**

A named vector where:

**names** NCBI IDs

**values** Species or genus names

**Source**

NCBI

## Examples

```
data(NCBI_ids)
# Can look up either with or without spaces
NCBI_ids["Bifidobacterium_breve"]
NCBI_ids["Bifidobacterium breve"]
```

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TaxSEA

*TaxSEA: Taxon Set Enrichment Analysis*

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## Description

TaxSEA enables rapid annotation of changes by testing for enrichment of pre-defined taxon sets.

## Usage

```
TaxSEA(
  taxon_ranks,
  lookup_missing = FALSE,
  min_set_size = 5,
  max_set_size = 100,
  custom_db = NULL
)
```

## Arguments

**taxon\_ranks** A named vector of log2 fold changes between control and test groups.

**lookup\_missing** Logical indicating whether to fetch missing NCBI IDs. Default is FALSE.

**min\_set\_size** Minimum size of taxon sets to include in the analysis. Default is 5.

**max\_set\_size** Maximum size of taxon sets to include in the analysis. Default is 100.

**custom\_db** A user-provided list of taxon sets. If NULL (default), the built-in database is used.

## Value

A list of data frames with taxon set enrichment results.

## See Also

- <https://doi.org/10.1093/nar/gkac868> for MiMeDB
- <https://doi.org/10.1093/nar/gkab1019> for GMrepo
- <https://doi.org/10.1093/nar/gkab786> for gutMGene
- <https://doi.org/10.1038/s41587-023-01872-y> for BugSigDB

## Examples

```
data("TaxSEA_test_data")
taxsea_results <- TaxSEA(TaxSEA_test_data)
```

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TaxSEA_db	<i>TaxSEA Database A dataset containing taxon sets. Each item in the list is a taxon set, and each member within a taxon set is a taxon.</i>
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**Description**

TaxSEA Database A dataset containing taxon sets. Each item in the list is a taxon set, and each member within a taxon set is a taxon.

**Usage**

```
TaxSEA_db
```

**Format**

A list of vectors. Each vector contains character strings representing taxa.

**Source**

See READ ME.

**Examples**

```
data(TaxSEA_db)
all_sets <- names(TaxSEA_db)
GABA_producers<-TaxSEA_db[["MiMeDB_producers_of_GABA"]]
```

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TaxSEA_test_data	<i>TaxSEA Test Data</i>
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**Description**

A dataset containing taxon ranks and taxon IDs.

**Usage**

```
TaxSEA_test_data
```

**Format**

A data frame with two columns:

**rank** Character vector representing taxon ranks

**id** Character vector representing taxon IDs

**Source**

See READ ME.

**Examples**

```
data(TaxSEA_test_data)
test_results <- TaxSEA(TaxSEA_test_data)
```

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