

Package ‘HMP2Data’

January 18, 2021

Title 16s rRNA sequencing data from the Human Microbiome Project 2

Version 1.4.0

Author John Stansfield <stansfieldjc@vcu.edu>,
Ekaterina Smirnova <ekaterina.smirnova@vcuhealth.org>,
Ni Zhao <nzhao10@jhu.edu>,
Jennifer Fettweis <jennifer.fettweis@vcuhealth.org>,
Levi Waldron <levi.waldron@sph.cuny.edu>,
Mikhail Dozmorov <mikhail.dozmorov@vcuhealth.org>

Maintainer John Stansfield <stansfieldjc@vcu.edu>, Ekaterina Smirnova <ekaterina.smirnova@vcuhealth.org>

Description HMP2Data is a Bioconductor package of the Human Microbiome Project 2 (HMP2) 16S rRNA sequencing data. Processed data is provided as phyloseq, SummarizedExperiment, and MultiAssayExperiment class objects. Individual matrices and data.frames used for building these S4 class objects are also provided in the package.

Depends R (>= 3.6.0)

License Artistic-2.0

Encoding UTF-8

LazyData false

BugReports <https://github.com/jstansfield0/HMP2Data/issues>

URL <https://github.com/jstansfield0/HMP2Data>

Imports AnnotationHub, assertthat, dplyr, ExperimentHub, kableExtra, knitr, magrittr, methods, readr, S4Vectors, SummarizedExperiment, phyloseq, MultiAssayExperiment, data.table

Suggests Biobase, BiocCheck, BiocManager, BiocStyle, cowplot, devtools, ggplot2, gridExtra, haven, rmarkdown, roxygen2, stats, testthat, tibble, UpSetR

biocViews ExperimentData, Homo_sapiens_Data, MicrobiomeData, ReproducibleResearch, SequencingData

RoxygenNote 7.1.1

VignetteBuilder knitr

git_url <https://git.bioconductor.org/packages/HMP2Data>

git_branch RELEASE_3_12

git_last_commit b9ed5eb
git_last_commit_date 2020-10-27
Date/Publication 2021-01-18

R topics documented:

| | |
|----------------------------|----|
| IBD16S | 2 |
| IBD16S_mtx | 3 |
| IBD16S_samp | 3 |
| IBD16S_tax | 3 |
| momspi16S | 4 |
| momspi16S_mtx | 5 |
| momspi16S_samp | 5 |
| momspi16S_tax | 5 |
| momspiCytokines | 6 |
| momspiCyto_mtx | 7 |
| momspiCyto_samp | 7 |
| momspiMultiAssay | 7 |
| patient_table | 8 |
| T2D16S | 9 |
| T2D16S_mtx | 10 |
| T2D16S_samp | 10 |
| T2D16S_tax | 10 |
| table_two | 11 |
| visit_table | 11 |

Index 12

| | |
|--------|---|
| IBD16S | <i>Create HMP2 16S sequencing data for Inflammatory Bowel Disease (IBD) phyloseq object</i> |
|--------|---|

Description

The HMP2 study gathered data on the microbiome for patients with different disease. This dataset contains 16S rRNA data for 196 patients with IBD over multiple visits.

Usage

```
IBD16S()
```

Format

A phyloseq object with 982 taxa and 178 samples.

OTU Table: A counts matrix for the rRNA-seq results.

Sample Data:

Project Name of the project

sample_id Sample identifier

subject_id Subject identifier See `colnames(sample_data(IBD16S()))` for remaining values.

Taxonomy Table: Taxonomy table for the taxa identified.

Value

a phyloseq object

Examples

```
IBD <- IBD16S()
```

 IBD16S_mtx

IBD16S_mtx

Description

Matrix of OTU values for 16S rRNA data for IBD

Usage

```
IBD16S_mtx
```

Format

An object of class `matrix` (inherits from `array`) with 982 rows and 178 columns.

 IBD16S_samp

IBD16S_samp

Description

Sample data for IBD16S data

Usage

```
IBD16S_samp
```

Format

An object of class `data.frame` with 178 rows and 490 columns.

 IBD16S_tax

IBD16S_tax

Description

Taxonomy data for IBD 16S data

Usage

```
IBD16S_tax
```

Format

An object of class `matrix` (inherits from `array`) with 982 rows and 6 columns.

`momspi16S`*Construct MOMS-PI 16S rRNA phyloseq object*

Description

The Multi-Omic Microbiome Study-Pregnancy Initiative (MOMS-PI) was funded by the NIH Roadmap HUMAN Microbiome Project to understand the impact of the vaginal microbiome on pregnancy and the fetal microbiome. This longitudinal study contains samples from various body sites of 596 women. This phyloseq object contains the 16S rRNA sequencing data that was collected. Also contained are the taxa data and participant metadata.

Usage

```
momspi16S()
```

Format

A phyloseq object with 7,665 taxa and 9,107 samples.

OTU Table: A counts matrix for the rRNA-seq results.

Sample Data:

file_id File identifier

md5 md5 hash for the file

size file size

urls URL for the file

sample_id Sample identifier

file_name Filename which the sample was taken from

subject_id Participant identifier

sample_body_site Body site of the sample

visit_number Visit number

subject_gender Participant gender

subject_race Participant race

study_full_name Name of the study

project_name Name of project

Taxonomy Table: Taxonomy table for the taxa identified.

Value

a phyloseq object

Examples

```
momspi <- momspi16S()
```

| | |
|---------------|----------------------|
| momspi16S_mtx | <i>momspi16S_mtx</i> |
|---------------|----------------------|

Description

16S rRNA OTU matrix for MOMS-PI data

Usage

momspi16S_mtx

Format

An object of class `matrix` (inherits from `array`) with 7665 rows and 9107 columns.

| | |
|----------------|-----------------------|
| momspi16S_samp | <i>momspi16S_samp</i> |
|----------------|-----------------------|

Description

Sample data for MOMS-PI 16S data

Usage

momspi16S_samp

Format

An object of class `data.frame` with 9107 rows and 13 columns.

| | |
|---------------|----------------------|
| momspi16S_tax | <i>momspi16S_tax</i> |
|---------------|----------------------|

Description

Taxonomy data for MOMS-PI 16S data

Usage

momspi16S_tax

Format

An object of class `matrix` (inherits from `array`) with 7665 rows and 7 columns.

`momspiCytokines`*Create MOMS-PI cytokines SummarizedExperiment object*

Description

The Multi-Omic Microbiome Study-Pregnancy Initiative (MOMS-PI) was funded by the NIH Roadmap Human Microbiome Project to understand the impact of the vaginal microbiome on pregnancy and the fetal microbiome. This longitudinal study contains samples from three body sites of 116 women. This summarizedExperiment object contains the cytokine data that was collected and the participant metadata.

Usage

```
momspiCytokines()
```

Format

A SummarizedExperiment object with 29 features and 1396 samples.

colData:

file_id File identifier

md5 md5 hash for the file

size file size

urls URL for the file

sample_id Sample identifier

file_name Filename which the sample was taken from

subject_id Participant identifier

sample_body_site Body site of the sample

visit_number Visit number

subject_gender Participant gender

subject_race Participant race

study_full_name Name of the study

project_name Name of project

Value

A SummarizedExperiment object

Examples

```
momspiCyto <- momspiCytokines()
```

| | |
|----------------|-----------------------|
| momspiCyto_mtx | <i>momspiCyto_mtx</i> |
|----------------|-----------------------|

Description

Cytokines matrix for MOMS-PI data

Usage

```
momspiCyto_mtx
```

Format

An object of class `matrix` (inherits from `array`) with 29 rows and 1396 columns.

| | |
|-----------------|------------------------|
| momspiCyto_samp | <i>momspiCyto_samp</i> |
|-----------------|------------------------|

Description

Sample data for MOMS-PI cytokines data

Usage

```
momspiCyto_samp
```

Format

An object of class `data.frame` with 1396 rows and 13 columns.

| | |
|------------------|--|
| momspiMultiAssay | <i>Make MOMS-PI MultiAssayExperiment</i> |
|------------------|--|

Description

Construct `MultiAssayExperiment` for MOMS-PI 16S rRNA and cytokines data.

Usage

```
momspiMultiAssay()
```

Format

A MultiAssayExperiment object with a 16S rRNA matrix and Cytokine matrix

16S: A counts matrix for the 16S rRNA-seq results.

cytokines: A counts matrix for the cytokines results.

colData:

file_id File identifier

md5 md5 hash for the file

size file size

urls URL for the file

sample_id Sample identifier

file_name Filename which the sample was taken from

subject_id Participant identifier

sample_body_site Body site of the sample

visit_number Visit number

subject_gender Participant gender

subject_race Participant race

study_full_name Name of the study

project_name Name of project

Value

A multiAssay Experiment object

Examples

```
momspiMA <- momspiMultiAssay()
```

patient_table

Generate patient summary table for HMP2 sample data

Description

This function allows you to produce a summary table for the HMP2Data data sets.

Usage

```
patient_table(x)
```

Arguments

x A named list of phyloseq or SummarizedExperiment objects.

Value

A knitr::kable table.

Examples

```
patient_table(list(momspi16S = momspi16S(),
  momspiCytokines = momspiCytokines(),
  IBD16S = IBD16S(), T2D16S = T2D16S()))
```

T2D16S

Create HMP2 16S sequencing data for Type 2 Diabetes (T2D) phyloseq object

Description

The HMP2 study gathered data on the microbiome for patients with different disease. This dataset contains 16S rRNA data for 79 patients with T2D over multiple visits.

Usage

```
T2D16S()
```

Format

A phyloseq object with 12,062 taxa and 2,208 samples.

OTU Table: A counts matrix for the rRNA-seq results.

Sample Data:

file_id File identifier

md5 md5 hash for the file

size file size

urls URL for the file

sample_id Sample identifier

file_name Filename which the sample was taken from

subject_id Participant identifier

sample_body_site Body site of the sample

visit_number Visit number

subject_gender Participant gender

subject_race Participant race

study_full_name Name of the study

project_name Name of project

Taxonomy Table: Taxonomy table for the taxa identified.

Value

a phyloseq object

Examples

```
T2D <- T2D16S()
```

T2D16S_mtx

T2D16S_mtx

Description

T2D 16S rRNA matrix

Usage

T2D16S_mtx

Format

An object of class `matrix` (inherits from `array`) with 12062 rows and 2208 columns.

T2D16S_samp

T2D16S_samp

Description

T2D 16S sample data

Usage

T2D16S_samp

Format

An object of class `data.frame` with 2208 rows and 13 columns.

T2D16S_tax

T2D16S_tax

Description

Taxonomy data for T2D 16S data

Usage

T2D16S_tax

Format

An object of class `matrix` (inherits from `array`) with 12062 rows and 7 columns.

| | |
|-----------|--|
| table_two | <i>Generate demographic summary table for HMP2 sample data</i> |
|-----------|--|

Description

This function allows you to produce a summary table for the HMP2Data data sets.

Usage

```
table_two(x)
```

Arguments

x A named list of phyloseq or SummarizedExperiment objects.

Value

A knitr::kable table.

Examples

```
table_two(list(momspi16S = momspi16S(),  
              momspiCytokines = momspiCytokines(),  
              IBD16S = IBD16S(), T2D16S = T2D16S()))
```

| | |
|-------------|-----------------------------|
| visit_table | <i>Make table of visits</i> |
|-------------|-----------------------------|

Description

This function allows you to produce a summary table for the HMP2Data visits.

Usage

```
visit_table(x)
```

Arguments

x A named list of phyloseq or SummarizedExperiment objects.

Value

A knitr::kable table.

Examples

```
visit_table(list(momspi16S = momspi16S(),  
                momspiCytokines = momspiCytokines(),  
                IBD16S = IBD16S(), T2D16S = T2D16S()))
```

Index

* datasets

- IBD16S_mtx, [3](#)
- IBD16S_samp, [3](#)
- IBD16S_tax, [3](#)
- momspi16S_mtx, [5](#)
- momspi16S_samp, [5](#)
- momspi16S_tax, [5](#)
- momspiCyto_mtx, [7](#)
- momspiCyto_samp, [7](#)
- T2D16S_mtx, [10](#)
- T2D16S_samp, [10](#)
- T2D16S_tax, [10](#)

- IBD16S, [2](#)
- IBD16S_mtx, [3](#)
- IBD16S_samp, [3](#)
- IBD16S_tax, [3](#)

- momspi16S, [4](#)
- momspi16S_mtx, [5](#)
- momspi16S_samp, [5](#)
- momspi16S_tax, [5](#)
- momspiCyto_mtx, [7](#)
- momspiCyto_samp, [7](#)
- momspiCytokines, [6](#)
- momspiMultiAssay, [7](#)

- patient_table, [8](#)

- T2D16S, [9](#)
- T2D16S_mtx, [10](#)
- T2D16S_samp, [10](#)
- T2D16S_tax, [10](#)
- table_two, [11](#)

- visit_table, [11](#)