

Moderate-to-Severe diarrhea 16S dataset

November 1, 2018

This data package contains the information used to run the analyses found in "Diarrhea in young children from low-income countries leads to large-scale alterations in intestinal microbiota composition". Measurements are the number of reads annotated for a particular cluster within a given sample followed by filtering. Sequencing was performed on the 454 Flex platform. Data is stored as an `MRExperiment`-class object. The count matrix was generated using DNAClust (<http://dnaclust.sourceforge.net/>). For more details please refer to the paper.

The help file `?msd16s` describes the example dataset.

1 The Data

We start by loading the library and the data.

```
> suppressMessages(library(metagenomeSeq))
> library(msd16s)
> data(msd16s)
```

This will load the `msd16s` object of class `MRExperiment`. As described in the `metagenomeSeq` vignette, `print` (or `show`) will display summary information.

```
> msd16s

MRExperiment (storageMode: environment)
assayData: 26044 features, 992 samples
  element names: counts
protocolData: none
phenoData
  sampleNames: 100259 100262 ... 602385 (992 total)
  varLabels: Type Country ... Dysentery (5 total)
  varMetadata: labelDescription
featureData
  featureNames: 54 94 ... 276421 (26044 total)
```

```

fvarLabels: superkingdom phylum ... clusterCenter (10 total)
fvarMetadata: labelDescription
experimentData: use 'experimentData(object)'
Annotation:

```

The data in `msd16s` is the substrate for the analysis described in "Diarrhea in young children from low-income countries leads to large-scale alterations in intestinal microbiota composition". Included in the `MRExperiment` object are the counts, phenotype and feature information.

The phenotype information can be accessed with the `phenoData` and `pData` methods:

```
> phenoData(msd16s)
```

```

An object of class 'AnnotatedDataFrame'
sampleNames: 100259 100262 ... 602385 (992 total)
varLabels: Type Country ... Dysentery (5 total)
varMetadata: labelDescription

```

```
> head(pData(msd16s))
```

| | Type | Country | Age | AgeFactor | Dysentery |
|--------|---------|---------|-----|-----------|-----------|
| 100259 | Case | Gambia | 14 | [12,18) | 1 |
| 100262 | Control | Gambia | 24 | [24,60) | 0 |
| 100267 | Case | Gambia | 17 | [12,18) | 0 |
| 100274 | Case | Gambia | 36 | [24,60) | 0 |
| 100275 | Case | Gambia | 29 | [24,60) | 0 |
| 100277 | Case | Gambia | 29 | [24,60) | 0 |

The feature information including cluster representative sequence can be accessed with the `featureData` and `fData` methods:

```
> featureData(msd16s)
```

```

An object of class 'AnnotatedDataFrame'
featureNames: 54 94 ... 276421 (26044 total)
varLabels: superkingdom phylum ... clusterCenter (10 total)
varMetadata: labelDescription

```

```
> head(fData(msd16s))
```

| | superkingdom | phylum | class | order | family |
|-----|--------------|------------|---------|-----------------|------------------|
| 54 | Bacteria | Firmicutes | Bacilli | Lactobacillales | Lactobacillaceae |
| 94 | Bacteria | Firmicutes | Bacilli | Lactobacillales | Lactobacillaceae |
| 113 | Bacteria | Firmicutes | Bacilli | Lactobacillales | Lactobacillaceae |

```

117   Bacteria   Firmicutes   Bacilli   Lactobacillales   Lactobacillaceae
145   Bacteria   Bacteroidetes   Bacteroidia   Bacteroidales   Prevotellaceae
202   Bacteria   Bacteroidetes   Bacteroidia   Bacteroidales   Bacteroidaceae
      genus                               species OTU
54   Lactobacillus   Lactobacillus   sp.   TSK   G32-2   54
94   Lactobacillus   Lactobacillus   sp.   TSK   G32-2   94
113  Lactobacillus   Lactobacillus   sp.   TSK   G32-2   113
117  Lactobacillus   Lactobacillus   sp.   TSK   G32-2   117
145   Prevotella     Prevotella     sp.   DJF_RP53   145
202   Bacteroides     Bacteroides     fragilis   202

```

```

54                                     ;cellular organisms;Bacteria;Firmicutes;Bacilli;Lactobacil
94                                     ;cellular organisms;Bacteria;Firmicutes;Bacilli;Lactobacil
113                                    ;cellular organisms;Bacteria;Firmicutes;Bacilli;Lactobacil
117                                    ;cellular organisms;Bacteria;Firmicutes;Bacilli;Lactobacil
145 ;cellular organisms;Bacteria;Bacteroidetes/Chlorobi group;Bacteroidetes;Bacteroidia
202  ;cellular organisms;Bacteria;Bacteroidetes/Chlorobi group;Bacteroidetes;Bacteroid

```

```

54   CATGCTGCCTCCCGTAGGAGTTTGGGCCGTGTCTCAGTCCCAATGTGGCCGATCAACCTCTCAGTTCGGCTACGTATCATCAO
94                                     CATGCTGCCTCCCGTAGGAGTTTGGGCCGTGTCTCAGTCCCAATGTGGCCGATCAACCTCTCA
113                                    CATGCTGCCTCCCGTAGGAGTTTGGGCCGTGTCTCAGTCCCAATGTGGCCGATCAACC
117                                    CATGCTGCCTCCCGTAGGAGTTTGGGCCGTGTCTCAGTCCCAATGTGGCCGATCAAC
145                                    CATGCTGCCTCCCGTAGGAGTTTGGACCGTGTCTCAGTTCCAATGTGGGGG
202                                    CATGCTGCCTCCCGTAGGAGTTTGGACCGTGTCTCAGT

```

The raw or normalized counts matrix can be accessed with the `MRcounts` function:

```
> head(MRcounts(msd16s[,1:10]))
```

```

      100259 100262 100267 100274 100275 100277 100291 100292 100293 100294
54      0      0      0      0      0      0      0      0      0      0
94      0      0      0      0      0      0      0      0      0      0
113     0      0      0      0      0      0      0      0      0      0
117     0      0      0      0      0      0      0      0      0      0
145     0      0      0      0      0      0      0      0      0      0
202     0      0      0      0      0      0      0      0      0      0

```

Using this class, the object can be easily subsetted, for example:

```
> msd16s_bangladesh = msd16s[,pData(msd16s)$Country == "Bangladesh"]
> msd16s_bangladesh
```

```
MRexperiment (storageMode: environment)
assayData: 26044 features, 206 samples
```

```
  element names: counts
protocolData: none
phenoData
  sampleNames: 600002 600005 ... 602385 (206 total)
  varLabels: Type Country ... Dysentery (5 total)
  varMetadata: labelDescription
featureData
  featureNames: 54 94 ... 276421 (26044 total)
  fvarLabels: superkingdom phylum ... clusterCenter (10 total)
  fvarMetadata: labelDescription
experimentData: use 'experimentData(object)'
Annotation:
```