Package ‘EBSEA’

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Type Package

Title Exon Based Strategy for Expression Analysis of genes

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Description Calculates differential expression of genes based on exon counts of genes obtained from RNA-seq sequencing data.

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biocViews Software, DifferentialExpression, GeneExpression, Sequencing

Imports edgeR, limma, gtools, graphics, stats

NeedsCompilation no

R topics documented:

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EBSEA Exon Based Strategy for Expression Analysis of genes

Description

EBSEA takes as input unnormalized counts of exons, normalizes them and then performs a two group comparison of the samples to detect differentially expressed between the groups. Both paired or unpaired comparison are supported. It calculates fold changes, p-values and false discovery rate of the genes between the groups.

Usage

EBSEA(countData, group, paired = FALSE, effects = NULL, plot = FALSE)
Arguments

- **countData**: A dataframe of exon count data
- **group**: A vector indicating the sample groups in the experiment
- **paired**: A logical indicating whether the samples are paired or unpaired. Default: FALSE
- **effects**: A vector indicating the paired samples.
- **plot**: A logical indicating whether a volcano plot is visualized. Default: FALSE

Value

EBSEA returns a list of two dataframes. ExonTable is a dataframe that contains exon statistics including log fold change, p-values, adjusted p-values, average expression and fold change. GeneTable is a dataframe that contains the corresponding fold change, log fold change, p-values and false discovery rate.

References


See Also

- `visualizeGenes`

Examples

```r
data(origCounts)
group <- c("Group1", "Group1", "Group1", "Group2", "Group2", "Group2")
result <- EBSEA(origCounts, group)
```

---

**filterCounts**

*Filter Count Data*

Description

The exons are filtered based on their expression levels so that each exon has a cpm (count per million) of more than 1 in user defined percent of the samples.

Usage

`filterCounts(x, noOfSamples)`

Arguments

- **x**: A numeric dataframe of counts in the sample with gene and exon number as the row names and samples as the column names
- **noOfSamples**: Percentage of the number of samples that should have cpm greater than 1.

Value

A dataframe of filtered counts of exons
filterGenes

See Also

EBSEA

Examples

data(origCounts)
res <- filterCounts(origCounts, 20)

filterGenes  

Description

The differentially expressed genes are filtered based on the FC and FDR provided by the user. The default thresholds are FC => 1.25 and fdr <= 0.01

Usage

filterGenes(x, fc = 1.25, fdr = 0.01)

Arguments

x  A dataframe containing the gene statistics returned by EBSEA.
fc  A fold change threshold for the genes to be filtered. Default: 1.25.
fdr  A FDR threshold for the genes to be filtered. Default: 0.01.

Value

A list containing upregulated and downregulated genes.

See Also

EBSEA

Examples

data(origCounts)
result <- EBSEA(origCounts, group)
filteredGenes <- filterGenes(result$GeneTable)
**origCounts**  
*Subset of Pasilla Dataset*

**Description**

origCounts consists of a subset of the exon counts from the pasilla dataset.

**Usage**

```r
data("origCounts")
```

**Format**

A data frame with 1000 observations on the following 7 variables.

- `treated1fb`  a numeric vector
- `treated2fb`  a numeric vector
- `treated3fb`  a numeric vector
- `untreated1fb`  a numeric vector
- `untreated2fb`  a numeric vector
- `untreated3fb`  a numeric vector
- `untreated4fb`  a numeric vector

**Value**

Dataset

**See Also**

EBSEA

**Examples**

```r
data(origCounts)
```

---

**visualizeGenes**  
*Visualize Gene*

**Description**

Plots for each exon of the gene entered by the user, the mean of the counts and the fold changes.

**Usage**

```r
visualizeGenes(gene, group, countData, result)
```
Arguments

gene  Gene Name. The gene name should be the from the genes in count data.
group  A vector indicating the sample group in the experiment.
countData  A dataframe of the original exon count data.
result  Results returned by EBSEA.

Value

A plot of mean counts and fold changes of exons of a gene.

See Also

EBSEA

Examples

data(origCounts)
group <- c('Group1', 'Group1', 'Group1', 'Group2', 'Group2', 'Group2', 'Group2')
result <- EBSEA(origCounts, group)
visualizeGenes('FBgn0000017', group, origCounts, result)
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