Package ‘AffyRNADegradation’

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Type Package

Title Analyze and correct probe positional bias in microarray data due to RNA degradation

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Depends R (&gt;= 2.9.0), methods, affy

Suggests AmpAffyExample

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Description The package helps with the assessment and correction of RNA degradation effects in Affymetrix 3' expression arrays. The parameter d gives a robust and accurate measure of RNA integrity. The correction removes the probe positional bias, and thus improves comparability of samples that are affected by RNA degradation.

License GPL-2


biocViews GeneExpression, Microarray, OneChannel, Preprocessing, QualityControl

NeedsCompilation no

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AffyDegradationBatch-class

Class AffyDegradationBatch

Description
This class represents Affymetrix GeneChip probe level data that has been analysed and corrected for the probe location bias.

Objects from the Class
Objects can be created using the function RNADegradation.

Slots
- location.type: Object of class character describing the type of probe position used for the analysis (probe index or probe location).
- afbatch: Object of class AffyBatch containing corrected probe level data.
- stats: Object of class matrix containing various statistical parameters from the analysis.
- means.pm: Object of class matrix containing the average PM probe intensites for probe locations of expressed genes.
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Methods
- afbatch signature(x = "AffyDegradationBatch"): returns as AffyBatch object containing corrected probe level data.
- d signature(x = "AffyDegradationBatch"): returns a vector with a measure of RNA degradation for each sample
- plotDx signature(x = "AffyDegradationBatch"): plots the probe location bias for all samples of the experiment.

Author(s)
Mario Fasold

See Also
AffyBatch

Examples
if (require(AmpAffyExample)) {
  # Get example data
data(AmpData)

  affy.deg <- RNADegradation(AmpData[,4])

  ## Plot degradation
AffyRNADegradation

The `AffyRNADegradation` package helps in the assessment of RNA degradation effects in Affymetrix 3’ expression arrays. The parameter d gives a robust and accurate measure of RNA integrity. The correction removes the probe positional bias, and thus improves comparability of samples that are affected by RNA degradation.

Details

```
Package: AffyRNADegradation
Type: Package
Version: 0.1.0
Date: 2011-10-13
License: GPL >=2
```

The `RNADegradation` function performs both analysis and correction of RNA degradation effects, returning an object of type `AffyDegradationBatch`. The class provides accessor functions to obtain the degradation parameter d and a `AffyBatch` object containing corrected probe intensities. A more detailed look on the RNA degradation effects can be gained through the tongs plot, the Dx plot and further statistics.

Author(s)

Mario Fasold

Examples

```
if (require(AmpAffyExample)) {
  # Load example data (AmpData affybatch)
  data(AmpData)

  ## Compute and correct degradation for a single chip (for speed)
  affy.deg <- RNADegradation(AmpData[,4])

  ## Show degradation parameter d
  d(affy.deg)

  ## Replace data with corrected data for further analysis
  AmpData <- afbatch(affy.deg)
}
```
GetTongs

Generate and visualize the tongs plot

Description
The tongs plot and the related degradation hook show the relationship between expression level and probe location bias. They are required for the correct estimation of RNA degradation effects.

Usage
GetTongs(affyData, chip.idx = 1)
PlotTongs(tongs)
PlotDegradationHooks(affyData, ...)

Arguments

affyData an AffyBatch object.
chip.idx index of the sample to compute the tongs for.
tongs the tongs plot data table.
... optional graphical parameters.

Value
Tongs a table containing Tongs plot values ordered by expression level.

Author(s)
Mario Fasold

Examples
if (require(AmpAffyExample)) {
  # Get example data
data(AmpData)

tongs <- GetTongs(AmpData, chip.idx = 4)
PlotTongs(tongs)
PlotDegradationHooks(AmpData[,c(3,4)])
}
RNADegradation

Compute degradation parameters and correct probe intensities

Description
Given an AffyBatch object, the function RNADegradation computes the probe positional bias and several statistical parameters, including a robust and accurate measure of RNA degradation. Probe intensities are corrected for the bias for each sample within the AffyBatch object.

Usage
RNADegradation(affyData,
location.type = "index",
location.file.dir = NULL,
plot.images = FALSE)

Arguments
affyData an AffyBatch object containing the probe level microarray data.
location.type index-based probe alignment (x=k) if "index", or location-based alignment (x=L) if "absolute".
location.file.dir directory containing the probe location file(s).
plot.images if TRUE plots a set of debug images.

Value
An AffyDegradationBatch object.

Author(s)
Mario Fasold

See Also
AffyDegradationBatch

Examples
if (require(AmpAffyExample)) {
  # Get example data
data(AmpData)

  affy.deg <- RNADegradation(AmpData[,4])
}
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