

# Package ‘focalCall’

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**Type** Package

**Title** Detection of focal aberrations in DNA copy number data

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**Depends** R(>= 2.10.0), CGHcall

**Suggests** RUnit, BiocGenerics

**Description** Detection of genomic focal aberrations in high-resolution DNA copy number data

**License** GPL-2

**biocViews** Microarray,Preprocessing,Visualization,Sequencing

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BierkensCNA	<i>Cervical cancer arrayCGH data</i>
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## Description

Example dataset with arrayCGH data of cervical pre-cancer lesions. OF NOTE: this set contains only 8 samples from the data and only the complete probeset for chromosome 2. Complete dataset is available from GEO (GSE34575).

**Usage**

BierkensCNA

**Format**

This dataset contain three files:

**CGHset** a CGHcall object containing 8 cervical pre-curses cancer lesions. These samples were taken from Bierkens et al. 2013 and available under GEO accession number GSE34575.

**CNVset** a bed file with CNV locations as provided by <http://dgv.tcag.ca/>.

**calls\_focals** Complete results file after running focalCall on the example data from Bierkens et al. 2013.

CGHset: A CGHcall object containing the following 8 samples:

**hgCIN.2.10\_16** high-grade Cervical Intra-epithelial Neoplasia sample: hgCIN.2.10\_16.

**hgCIN.2.13\_16** high-grade Cervical Intra-epithelial Neoplasia sample: hgCIN.2.13\_16.

**hgCIN.2.8\_31** high-grade Cervical Intra-epithelial Neoplasia sample: hgCIN.2.8\_31.

**hgCIN.2.16\_31** high-grade Cervical Intra-epithelial Neoplasia sample: hgCIN.2.16\_31.

**CIN3.1.2\_16** Cervical Intra-epithelial Neoplasia sample: CIN3.1.2\_16.

**hgCIN.2.4\_16** high-grade Cervical Intra-epithelial Neoplasia sample: hgCIN.2.4\_16.

**CIN3.1.8\_16** Cervical Intra-epithelial Neoplasia sample: CIN3.1.8\_16.

**hgCIN.2.19\_58** high-grade Cervical Intra-epithelial Neoplasia sample: hgCIN.2.19\_58.

CNVset: A bed file containing the following columns:

**CNV ID** Identification ID for copy number variation (CNV)

**start** Basepair position that indicates start of CNV

**end** Basepair position that indicates end of CNV

calls\_focals: results file after running focalCall on the samples described above:

**calls\_focals** results file of class cghCall

**Value**

Three datasets are returned as described in the section above.

**Source**

Bierkens, M., Krijgsman, O., Wilting, S.M., Bosch, L., Jaspers, A., Meijer, G.A., Meijer, C.J., Snijders, P.J., Ylstra, B., Steenbergen, R.D. (2013). Focal aberrations indicate EYA2 and hsa-miR-375 as oncogene and tumor suppressor in cervical carcinogenesis. *Genes Chromosomes Cancer* 52,56-68.

**Examples**

```
# Load the data file
data(BierkensCNA)
```

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focalCall	<i>Detection genomic focal aberrations</i>
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**Description**

Detection of genomic focal copy number aberrations from high-resolution arrayCGH data or shallow-Seq copy number data.

**Usage**

```
focalCall(CGHset, CNVset , focalSize = 3, minFreq=2)
```

**Arguments**

CGHset	Object of class <code>cghCall</code> , contains CGHcall output of tumor data.
CNVset	Object of class <code>cghCall</code> , contains CGHcall output of matched normal data or .bed file with CNV locations.
focalSize	Threshold for the function <code>focalCall</code> . Sets max size of a focal aberration/
minFreq	Threshold for the function <code>focalCall</code> . Sets minimal number of samples that contain the aberration/

**Details**

`focalCall` is applied to the calls of an object of class `cghCall` (as returned by `CGHcall` version 1.2.0 or higher). `FocalCall` extract all focal aberrations from the tumor copy number data and

**Value**

Two files are returned - an object of class `cghCall` and a text files with all focal aberrations detected in all sample.

- "focalCall.Rdata" is an object of class `cghCall` and contains all DNA copy number information including the focal aberrations.
- "focalList\_sampleName.txt" is a text file with all focal aberrations detected in the set of sample.

**Author(s)**

Oscar Krijgsman: <o.krijgsman@vumc.nl>

**References**

Krijgsman O., Benner C., Meijer G.A., Van de Wiel, M.A., Ylstra, B. (2013), "FocalCall: an R-package to detect genomic focal aberrations.", *Submitted*

**See Also**

focalCall, CGHcall

**Examples**

```
# Generate object of cghCall class object and input files
data(BierkensCNA)

# Extract focal aberrations and distinguish somatic from germ-line copy number aberrations (CNA)
ExampleRun<-focalCall(CGHset, CNVset, focalSize=3, minFreq=2)
```

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FreqPlot                      *frequency plot copy number aberrations.*

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**Description**

Frequency plot of all aberrations in the dataset.

**Usage**

```
FreqPlot(calls, header)
```

**Arguments**

calls	Object of class focalCall, contains focalCall output.
header	String with header name of frequencyPlot.

**Details**

FreqPlot is applied to the calls of an object of class cghCall (as returned by focalCall).

**Value**

A single plot is returned with the frequency of aberrations in the complete dataset. The x-axis represents the chromosomes, the y-axis the percentage of samples with a gain or loss at that genomic position.

**Author(s)**

Oscar Krijgsman: <o.krijgsman@vumc.nl>

**References**

Krijgsman O., Benner C., Meijer G.A., Van de Wiel, M.A., Ylstra, B. (2013), "FocalCall: an R-package to detect genomic focal aberrations.", *Submitted*

**See Also**

focalCall, CGHcall

## Examples

```
# Load example data
data(BierkensCNA)

# generate frequency plot of copy number data
FreqPlot(calls_focals, "FrequencyPlot_BierkensSamples")
```

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FreqPlotfocal	<i>frequency plot focal copy number aberrations.</i>
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## Description

Frequency plot of focal aberrations in the dataset.

## Usage

```
FreqPlotfocal(calls, header)
```

## Arguments

calls	Object of class focalCall, contains focalCall output.
header	String with header name of frequencyPlot.

## Details

FreqPlot is applied to the calls of an object of class cghCall (as returned by focalCall version 0.0.99 or higher).

## Value

A single plot is returned with the frequency of focal aberrations in the complete dataset. The x-axis represents the chromosomes, the y-axis the percentage of samples with a focal gain or focal loss at that genomic position. CNVs are also plotted but in grey.

## Author(s)

Oscar Krijgsman: <o.krijgsman@vumc.nl>

## References

Krijgsman O., Benner C., Meijer G.A., Van de Wiel, M.A., Ylstra, B. (2013), "FocalCall: an R-package to detect genomic focal aberrations.", *Submitted*

## See Also

focalCall, CGHcall

## Examples

```
# Load example data
data(BierkensCNA)

# generate frequency plot of copy number data for focal aberrations only
FreqPlotfocal(calls_focals, "FrequencyPlot_focals_BierkensSamples")
```

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igvFiles	<i>Match Ensembl genes to focal aberrations.</i>
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## Description

Generates three tracks that can be loaded into IGV (). 1) Segmented data per sample 2) frequency plot based on the calls from CGHcall 3) Frequency plot of focal aberrations as generated with focalCall.

## Usage

```
igvFiles(CGHset)
```

## Arguments

CGHset            Object of class focalCall, contains focalCall output.

## Details

igvFocal is applied to a (as returned by focalCall version 0.0.99 or higher).

## Value

Three IGV readable files are returned - Frequency aberrations, Frequency focal aberrations and all segmented values for all samples.

- "FrequencyPlot.igv" is a IGV readable files and contains the frequency plot of all samples and all aberrations.
- "FrequencyPlotfocals.igv" is a IGV readable files and contains the frequency plot of all samples and all focal aberrations.
- "Overview\_segments.igv" is a IGV readable files and contains the segmentation log2ratio values.

## Author(s)

Oscar Krijgsman: <o.krijgsman@nki.nl>

## References

Krijgsman O., Benner C., Meijer G.A., Van de Wiel, M.A., Ylstra, B. (2013), "FocalCall: an R-package to detect genomic focal aberrations.", *Submitted*

## See Also

focalCall, CGHcall

## Examples

```
data(BierkensCNA)

# generate IGV readable files
igvFiles(calls_focals)
```

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singleSample

*Detection focal aberrations with 1 sample only*

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## Description

Detection and plotting of focal aberrations and distinguish somatic from germ-line in a single sample. This function, as focalCall can be used for samples with and without patient matched normal data.

## Usage

```
singleSample(CGHset, CNVset, focalSize=3, OverlapPerc=0.2)
```

## Arguments

CGHset	Object of class cghCall, contains CGHcall output of tumor data.
CNVset	Object of class cghCall, contains CGHcall output of matched normal data or .bed file with CNV locations.
focalSize	Threshold for the function singleSample. Sets max size of a focal aberration/
OverlapPerc	Threshold for the function singleSample. sets minimal overlap of focal aberration with CNVs from in CNdata.normal to be classified as germ-line./

## Details

singleSample is applied to the calls of an object of class cghCall.

**Value**

Three files are returned - an object of class `cghCall`, a text files with all focal aberrations listed and a plot with the genomic aberrations in the sample.

- "focalCall\_sampleName.Rdata" is an object of class `cghCall` and contains all DNA copy number information including the focal aberrations.
- "focalList\_sampleName.txt" is a text file with all focal aberrations detected in the sample.
- "sampleName.png" is a plot with the genomic aberrations in the sample.

**Author(s)**

Oscar Krijgsman: <o.krijgsman@vumc.nl>

**References**

Krijgsman O., Benner C., Meijer G.A., Van de Wiel, M.A., Ylstra, B. (2013), "FocalCall: an R-package to detect genomic focal aberrations.", *Submitted*

**See Also**

`focalCall`, `CGHcall`

**Examples**

```
# generate object of cghCall class object and input files
data(BierkensCNA)
```

```
# Extract focal aberrations and distinguish somatic from germ-line copy number aberrations (CNA) in a single sample
singleSample(CGHset[,1], CNVset, focalSize=3)
```



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