

# QoRTs Example Dataset

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## 1 Overview

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The QoRTs software package is a fast, efficient, and portable multifunction toolkit designed to assist in the analysis, quality control, and data management of RNA-Seq datasets. Its primary function is to aid in the detection and identification of errors, biases, and artifacts produced by paired-end high-throughput RNA-Seq technology. In addition, it can produce count data designed for use with differential expression <sup>1</sup> and differential exon usage tools <sup>2</sup>, as well as individual-sample and/or group-summary genome track files suitable for use with the UCSC genome browser (or any compatible browser).

The QoRTsExampleData package contains QoRTs QC summary output from an example dataset, designed for use with QoRTs and used in the QoRTs vignette. Due to size constraints this package does not include the raw bam-files themselves. The actual bamfiles, along with a step-by-step example walkthrough that covers the entire analysis pipeline, are linked to from the QoRTs github website (<https://github.com/hartleys/QoRTs>).

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<sup>1</sup>Such as [DESeq](#), [DESeq2](#)[1] or [edgeR](#)[2]

<sup>2</sup>Such as [DEXSeq](#)[3]

For more information on the QoRTs package, see the QoRTs vignette and reference manual, which can be found at <https://github.com/hartleys/QoRTs>.

## 1.1 Example data

The separate R package *QoRTsExampleData* contains an example dataset with an example decoder:

```
directory <- system.file("extdata/", package="QoRTsExampleData",
                          mustWork=TRUE);
decoder.file <- system.file("extdata/decoder.txt",
                            package="QoRTsExampleData",
                            mustWork=TRUE);
decoder.data <- read.table(decoder.file,
                          header=T,
                          stringsAsFactors=F);
print(decoder.data);
```

##	sample.ID	lane.ID	unique.ID	qc.data.dir	group.ID	input.read.pair.count
## 1	SAMP1	L1	SAMP1_RG1	ex/SAMP1_RG1	CASE	465298
## 2	SAMP1	L2	SAMP1_RG2	ex/SAMP1_RG2	CASE	472241
## 3	SAMP1	L3	SAMP1_RG3	ex/SAMP1_RG3	CASE	500691
## 4	SAMP2	L1	SAMP2_RG1	ex/SAMP2_RG1	CASE	461405
## 5	SAMP2	L2	SAMP2_RG2	ex/SAMP2_RG2	CASE	467713
## 6	SAMP2	L3	SAMP2_RG3	ex/SAMP2_RG3	CASE	492322
## 7	SAMP3	L1	SAMP3_RG1	ex/SAMP3_RG1	CASE	485397
## 8	SAMP3	L2	SAMP3_RG2	ex/SAMP3_RG2	CASE	489859
## 9	SAMP3	L3	SAMP3_RG3	ex/SAMP3_RG3	CASE	516906
## 10	SAMP4	L1	SAMP4_RG1	ex/SAMP4_RG1	CTRL	460968
## 11	SAMP4	L2	SAMP4_RG2	ex/SAMP4_RG2	CTRL	468391
## 12	SAMP4	L3	SAMP4_RG3	ex/SAMP4_RG3	CTRL	484530
## 13	SAMP5	L1	SAMP5_RG1	ex/SAMP5_RG1	CTRL	469884
## 14	SAMP5	L2	SAMP5_RG2	ex/SAMP5_RG2	CTRL	475001
## 15	SAMP5	L3	SAMP5_RG3	ex/SAMP5_RG3	CTRL	494213
## 16	SAMP6	L1	SAMP6_RG1	ex/SAMP6_RG1	CTRL	452429
## 17	SAMP6	L2	SAMP6_RG2	ex/SAMP6_RG2	CTRL	458810
## 18	SAMP6	L3	SAMP6_RG3	ex/SAMP6_RG3	CTRL	477751

Due to size constraints the example dataset contained in this R package includes only the QC output data, not the raw bam-files themselves. The actual bamfiles, along with a step-by-step example walkthrough that covers the entire analysis pipeline, are linked to from the QoRTs github website (<https://github.com/hartleys/QoRTs>).

The example dataset is derived from a set of rat pineal gland samples, which were multiplexed and sequenced across six sequencer lanes. For the sake of simplicity, the example dataset was limited to only six samples and three lanes. However, the bam files alone would still occupy 18 gigabytes of disk space, which would make it unsuitable for distribution as an example dataset. To further reduce

the example bamfile sizes, only reads that mapped to chromosomes chr14, chr15, chrX, and chrM were included. Additionally, all the selected chromosomes EXCEPT for chromosome 14 were randomly downsampled to 30 percent of their original read counts.

THIS DATASET IS INTENDED FOR DEMONSTRATION AND TESTING PURPOSES ONLY. Due to the various alterations that have been made to reduce file sizes and improve portability, it is really not suitable for any actual analyses.

For more information on how to use this dataset, see the QoRTs vignette and reference manual, which can be found at <https://github.com/hartleys/QoRTs>.

## 2 References

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- [1] Simon Anders and Wolfgang Huber. Differential expression analysis for sequence count data. *Genome Biology*, 11:R106, 2010. URL: <http://genomebiology.com/2010/11/10/R106>.
- [2] Mark D. Robinson and Gordon K. Smyth. Moderated statistical tests for assessing differences in tag abundance. *Bioinformatics*, 23:2881, 2007. URL: <http://bioinformatics.oxfordjournals.org/cgi/content/abstract/23/21/2881>, arXiv:<http://bioinformatics.oxfordjournals.org/cgi/reprint/23/21/2881.pdf>, doi:10.1093/bioinformatics/btm453.
- [3] Simon Anders, Alejandro Reyes, and Wolfgang Huber. Detecting differential usage of exons from RNA-seq data. *Genome Research*, 22:2008, 2012. doi:10.1101/gr.133744.111.

## 3 Session Information

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The session information records the versions of all the packages used in the generation of the present document.

```
sessionInfo()

## R version 3.3.0 (2016-05-03)
## Platform: x86_64-pc-linux-gnu (64-bit)
## Running under: CentOS release 6.8 (Final)
##
## locale:
##  [1] LC_CTYPE=en_US.UTF-8      LC_NUMERIC=C
##  [3] LC_TIME=en_US.UTF-8      LC_COLLATE=C
##  [5] LC_MONETARY=en_US.UTF-8  LC_MESSAGES=en_US.UTF-8
##  [7] LC_PAPER=en_US.UTF-8     LC_NAME=C
##  [9] LC_ADDRESS=C             LC_TELEPHONE=C
## [11] LC_MEASUREMENT=en_US.UTF-8 LC_IDENTIFICATION=C
##
## attached base packages:
```

```
## [1] stats      graphics  grDevices utils      datasets  methods   base
##
## other attached packages:
## [1] QoRTs_1.2.25 Cairo_1.5-9  knitr_1.15.1
##
## loaded via a namespace (and not attached):
## [1] BiocStyle_2.2.1 magrittr_1.5    tools_3.3.0     stringi_1.1.2
## [5] highr_0.6       stringr_1.1.0  evaluate_0.10
```

## 4 Legal

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NOTE: The Scala package includes (internally) the sam-JDK library (sam-1.113.jar), from picard tools. The MIT license and copyright information can be accessed using the command:

```
java -jar /path/to/jarfile/QoRTs.jar ? samjdkinfo
```