

gxTools: Automating Transcriptome Analysis

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Wolfgang.Raffelsberger@igbmc.fr

LBGI

Laboratoire de **B**io-Informatique et **G**énomique **I**ntégratives
IGBMC, Strasbourg



Transcriptomics Context

Motivation

- **Microarrays still widely used in transcriptomics**
now as fast & cheap pre-experiment for deep sequencing
- **Need of highly automated systems**
too long delays for expert manual/interactive analysis

Transcriptomics Context

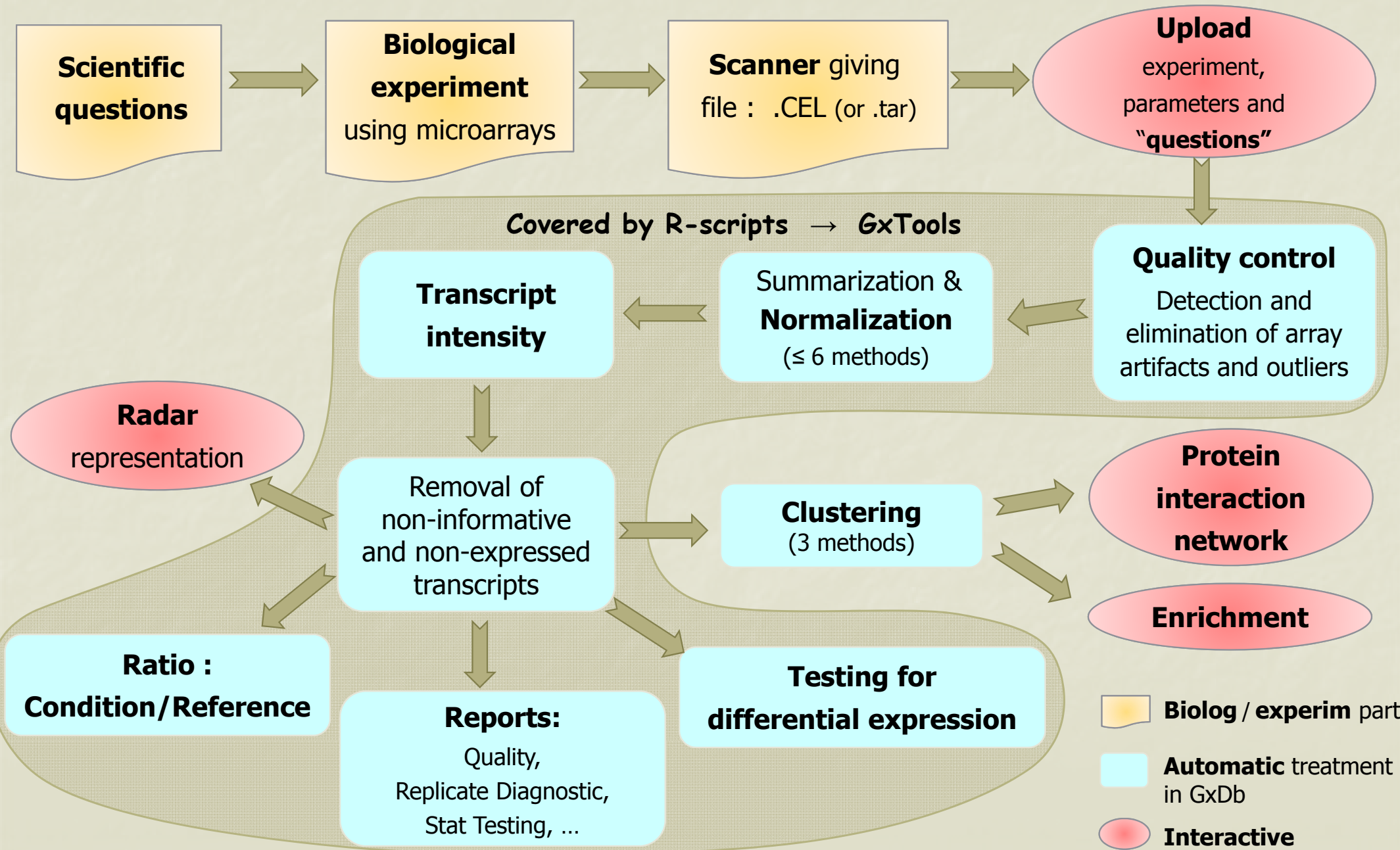
Motivation

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Means

- **Formalization** of experimental Design
- **Simplification**
of results *and/or* manipulations & interactions for user
- **Integration**
in related databases and mining tools

GxDb Flowchart: From Biology to Information



GxDb Gene eXpression Database

... my Login and Groups



GX **FunctionalGenomics** Dissemination Collaborations WebTools

Welcome FunctionalGenomics **Transcriptomics** GenoretGenes

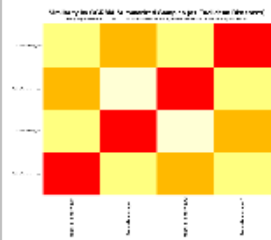
Welcome Transcriptomics | GxUpload | GxPipeWork | Selector | Radar Generator | Radar Display | Site Map | Dazibao Edit 4 | Dazibao New | Dazibao Manage |

Move out of frame
Manage Session

GxDb Transcriptomics Experiments Summary

[5 PeripheryMacula](#)

Periphery versus Macula
arraytype HG_U95A
2 realexp with 2 [samples](#)

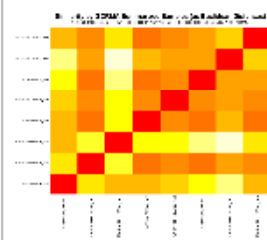


[6 congRD1](#)

PRIVATE

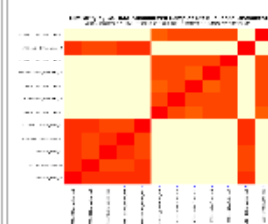
[7 A764Nxn1](#)

A764 mice retina of wt and nxn1 mutants
arraytype Mouse430_2
3 realexp with 3 [samples](#)



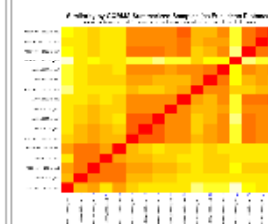
[8 A777Nxn2](#)

A777 mice retina and olfactory epithelium of wt and nxn2 mutants
arraytype Mouse430_2
4 realexp with 4 [samples](#)



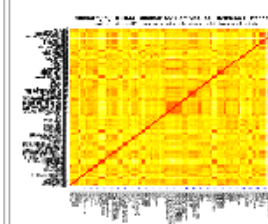
[9 A908Nxn1Lux](#)

A908 mice retina of wt and nxn1 mutant exposed to different lights
arraytype Mouse430_2
6 realexp with 6 [samples](#)



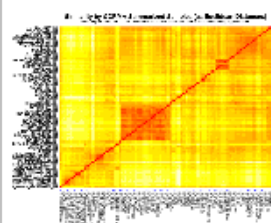
[10 MouseGeneAtlasV3](#)

Transcription profiling of mouse tissues - GNF Mouse GeneAtlas V3
arraytype Mouse430_2
91 realexp with 91 [samples](#)



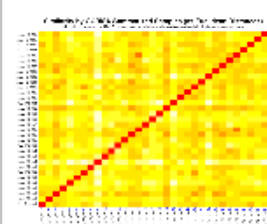
[11 HumanGeneAtlas](#)

Transcription profiling of human cell lines and tissues - Tissue-specific pattern of mRNA expression
arraytype HG-U133A
79 realexp with 79 [samples](#)



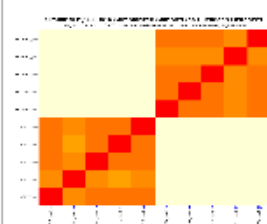
[12 ALL](#)

Acute Lymphoblastic Leukemia Data from the Ritz Laboratory
arraytype HG_U95Av2
5 realexp with 5 [samples](#)



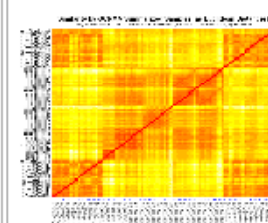
[13 HumanBreastCancer](#)

Expression profiling of breast cancer cell lines MCF-7 and MCF-7R4
arraytype HG-U133_Plus_2
2 realexp with 2 [samples](#)



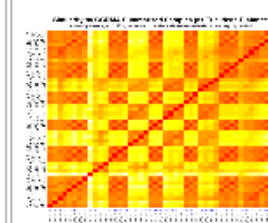
[15 Blood_Xigris2](#)

Blood_Xigris2
arraytype HG-U133_Plus_2
4 realexp with 4 [samples](#)



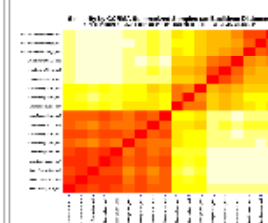
[16 Calvano2005](#)

LPS reaction in human blood
arraytype HG-U133A
12 realexp with 12 [samples](#)



[17 HumanEmbryo](#)

Time course expression data from early Human embryo
arraytype HG-U133_Plus_2
6 realexp with 6 [samples](#)



Experiment 17 HumanEmbryo Time course expression data from early Human embryo

description The process of early development of mammals is subtly and accurately controlled by the regulation networks of embryo cells. Time course expression data measured at different stages during early embryo development process can give us valuable information by revealing the dynamic expression patterns of genes in genome wide scale. In this study, Human embryo expression data were generated at one cell stage, two cell stage, four cell stage, eight cell stage, morula, and blastocyst.

publication Xie D, Chen CC, Ptaszek LM, Xiao S et al. Rewirable gene regulatory networks in the preimplantation embryonic development of three mammalian species. Genome Res 2010 Jun;20(6):804-15.

authors Xie D

abstract

pubmedid PMID: 20219939

geoid GSE18290

sample_preparation Human embryos were harvested at successive stage from oocyte to blastocyst. Total RNAs were extracted, amplified and hybridized onto Affymetrix microarrays.

grog all_people

realexps ,RealExp= 237 238 239 240 241 242

Modify these values with the [GXManageExperiment](#) PipeWork

Display signal intensity radars with the [GXRadarGenerator](#) PipeWork

Input files :

[InputR1](#)
[InputR2](#)

Quality and Diagnostic reports :

[HumanEmbryo GxDBAffyQC2.pdf](#)
[HumanEmbryo GxDBdiagn1.pdf](#)
[HumanEmbryo GxDBdiagn2.pdf](#)

Cluspack heatmaps :

[HumanEmbryo dChip heatmap km dpc.png](#)
[HumanEmbryo dChip heatmap mm aic.png](#)
[HumanEmbryo dChip heatmap mm bic.png](#)
[HumanEmbryo gcrma heatmap km dpc.png](#)
[HumanEmbryo gcrma heatmap mm aic.png](#)
[HumanEmbryo gcrma heatmap mm bic.png](#)
[HumanEmbryo mas5 heatmap km dpc.png](#)
[HumanEmbryo mas5 heatmap mm aic.png](#)
[HumanEmbryo mas5 heatmap mm bic.png](#)
[HumanEmbryo plier heatmap km dpc.png](#)
[HumanEmbryo plier heatmap mm aic.png](#)
[HumanEmbryo plier heatmap mm bic.png](#)
[HumanEmbryo rma heatmap km dpc.png](#)
[HumanEmbryo rma heatmap mm aic.png](#)
[HumanEmbryo rma heatmap mm bic.png](#)
[HumanEmbryo vsn heatmap km dpc.png](#)
[HumanEmbryo vsn heatmap mm aic.png](#)
[HumanEmbryo vsn heatmap mm bic.png](#)

Differential expression :

Display differential expression for [1405 237 238 1](#)
Display differential expression for [1406 237 238 2](#)
Display differential expression for [1407 237 238 3](#)
Display differential expression for [1408 237 238 4](#)
Display differential expression for [1409 237 238 5](#)

Quality and Diagnostic Reports (pdf)

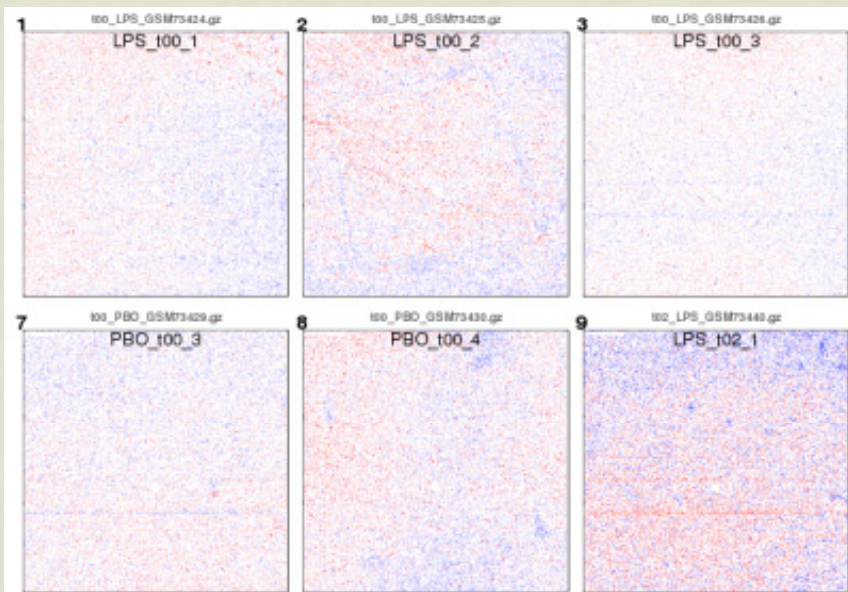
Quality
Report

Replicate
Diagnostic
Report

Stat Testing
Report

(soon)

Stat Test
Results



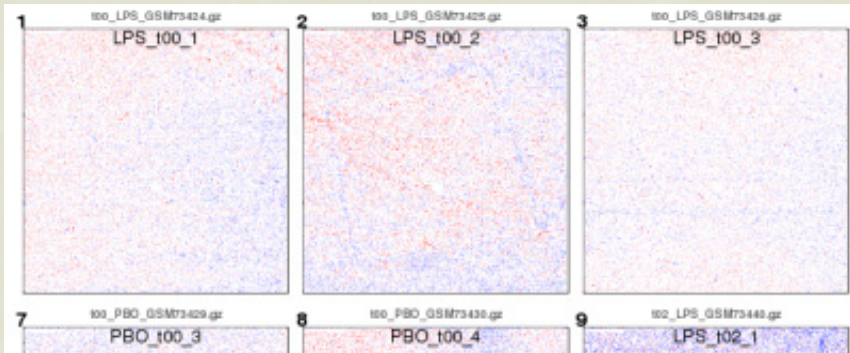
Quality and Diagnostic Reports (pdf)

Quality Report

Replicate Diagnostic Report

Stat Testing Report

(soon)
Stat Test Results



	fileName	sampleName	samplePk	repNo	%P	qc.ok	use
1	t00_LPS_GSM73424.CEL.gz	LPS_t00	225	1	45	yes	yes
2	t00_LPS_GSM73425.CEL.gz	LPS_t00	225	2	47	yes	yes
3	t00_LPS_GSM73426.CEL.gz	LPS_t00	225	3	45	yes	yes
4	t00_LPS_GSM73427.CEL.gz	LPS_t00	225	4	48	yes	yes
5	t00_PBO_GSM73423.CEL.gz	PBO_t00	226	1	45	yes	yes
6	t00_PBO_GSM73428.CEL.gz	PBO_t00	226	2	46	yes	yes
7	t00_PBO_GSM73429.CEL.gz	PBO_t00	226	3	46	yes	yes
8	t00_PBO_GSM73430.CEL.gz	PBO_t00	226	4	43	yes	yes
9	t02_LPS_GSM73440.CEL.gz	LPS_t02	227	1	30	no	no

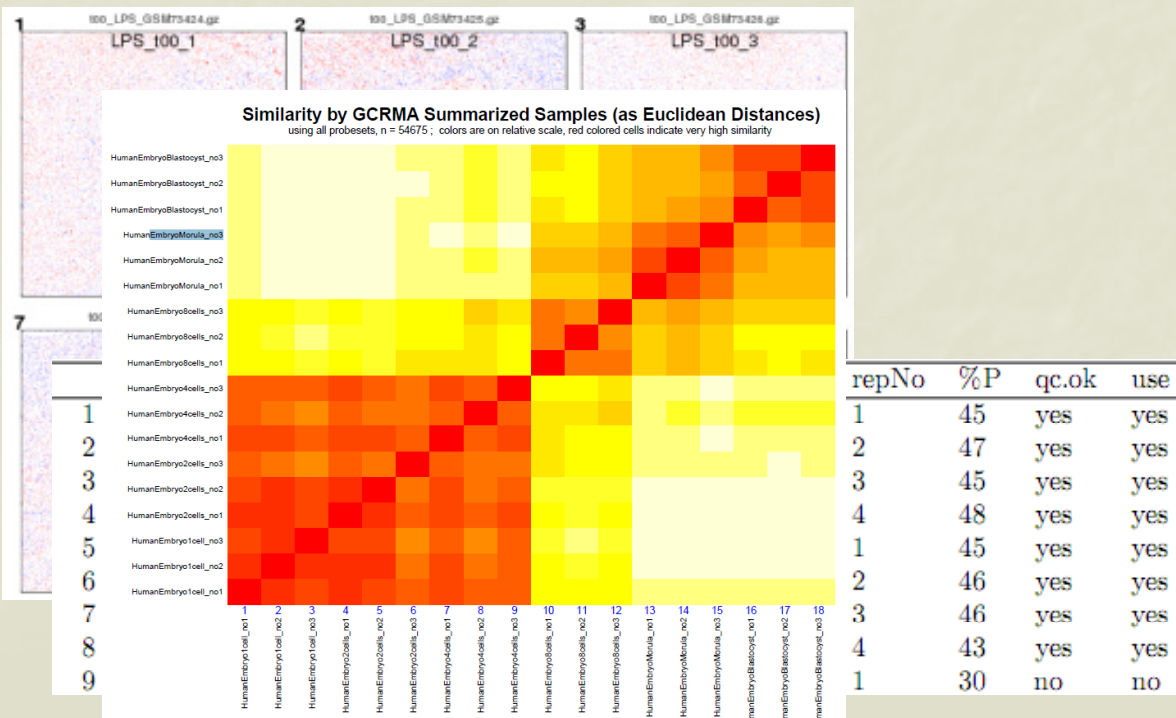
Quality and Diagnostic Reports (pdf)

Quality Report

Replicate Diagnostic Report

Stat Testing Report

(soon)
Stat Test Results



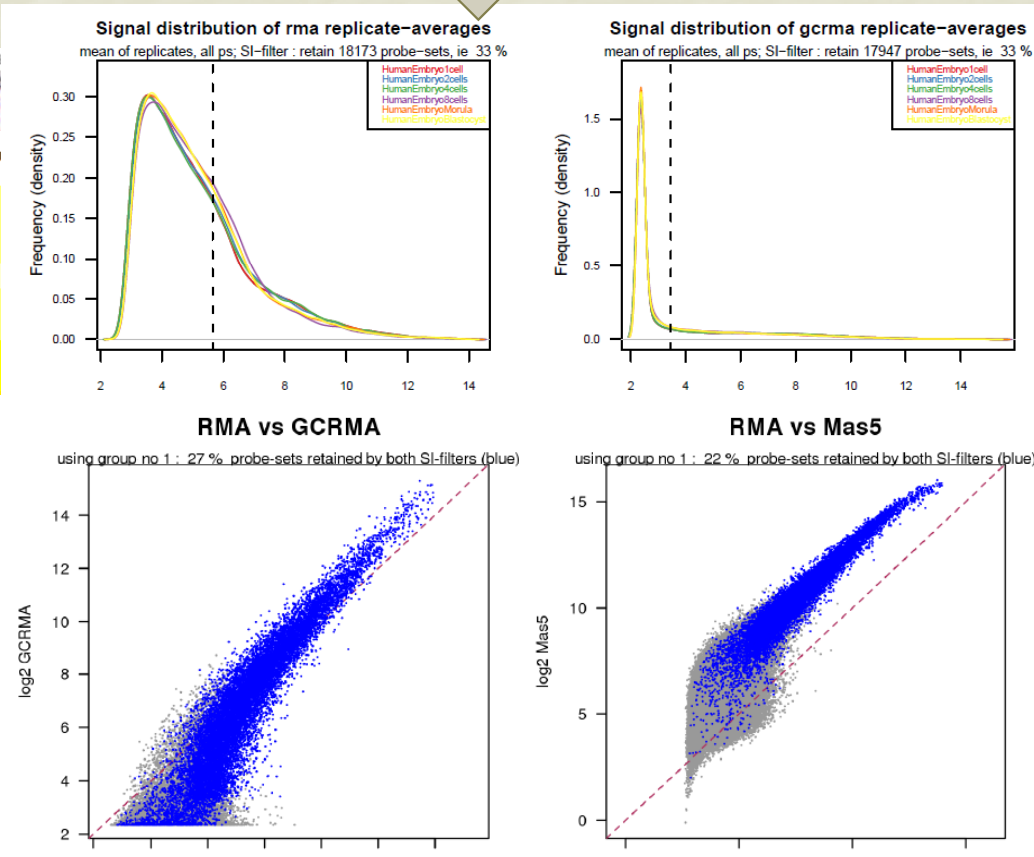
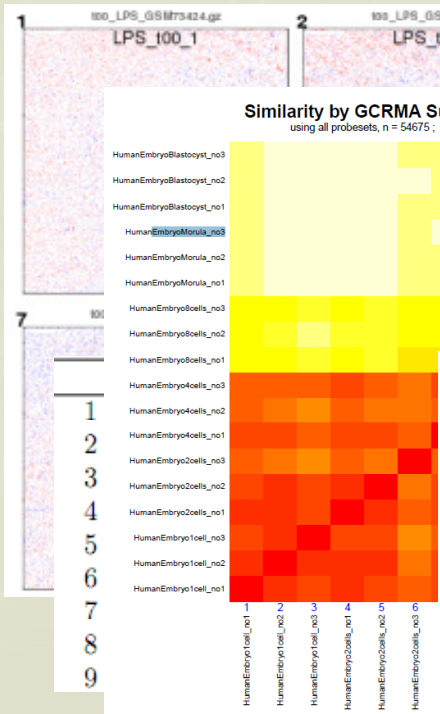
Quality and Diagnostic Reports (pdf)

Quality Report

Replicate Diagnostic Report

Stat Testing Report

(soon)
Stat Test Results



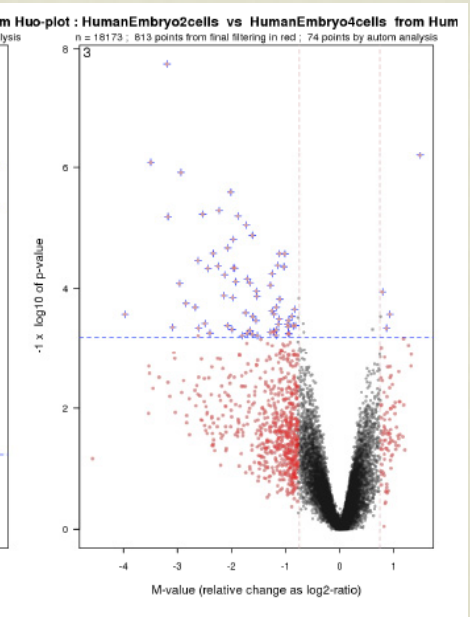
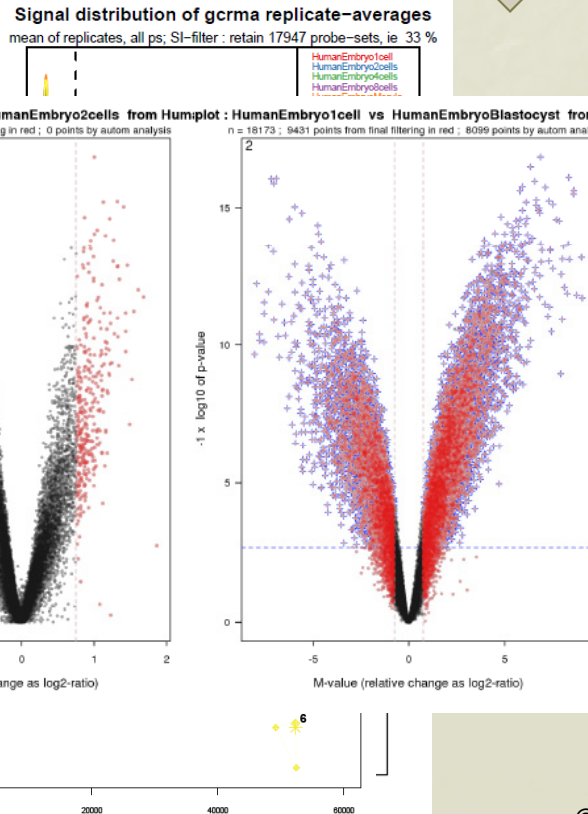
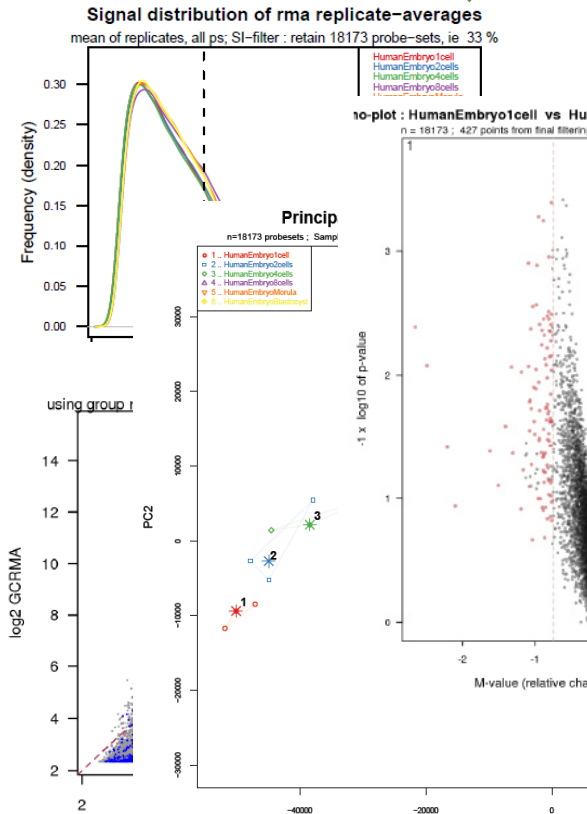
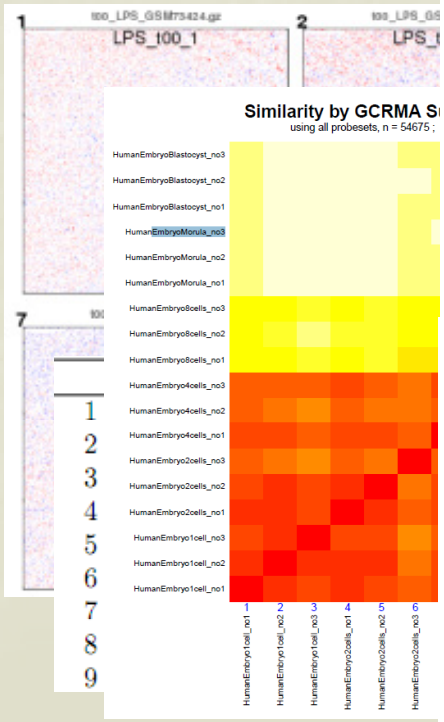
Quality and Diagnostic Reports (pdf)

Quality Report

Replicate Diagnostic Report

Stat Testing Report

(soon)
Stat Test Results



GxTools Details

➤ **gxSet - Class**

- ❖ **SIdata** (SimpleList, for mult. ExpressionSet)
 - ❖ **AvData** (gxAvData, for mult. SimpleList: averages, SEM,...)
 - ❖ **tests** (gxTests, for mult extended MArrayLM)
 - ❖ **parameters**
 - ❖ **esetRaw** (optional ExpressionSet for raw data)
 - ❖ **notes**
-
- **≥ 50 functions** separate/isolated functionalities
 - ≥ 30 fx for accessing data from class 'gxSet'
 - export as SQL tables or regular matrixes
 - Some **speed-optimizations**, memory issues

LBGI & BIPS

Xavier Brochet
 Odile Lecompte
 Benjamin Linard
 Tien-Dao Luu
 Luc Moulinier
 Jean Muller

Ngoc-Hoan Nguyen
Nicodème Paul
Laetitia Poidevin
 Wolfgang Raffelsberger
Raymond Ripp
 Nicolas Wicker

Frédéric Plewniak
 Laurent Bianchetti
 Véronique Geoffroy
 Sophie Siguenza

Olivier Poch

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Radhouene Aniba
Yannick-Noël Anno
Anne Friedrich
David Kieffer
Emeline Leproult



Computing Service S Uge, G Seith

TCA Platform L Brino, B Fischer

Microarray Platform C Thibault-Charpentier



and



Hôpital Hautepierre (Strasbourg)
 Inserm U682 & U748

