



# Data Sheet

## GeneChip® Rat Genome 230 Arrays

The GeneChip® Rat Genome 230 2.0 Array in cartridge format provides comprehensive coverage of the rat genome and is the first whole-genome array to interrogate over 30,000 transcripts and variants from the rat genome, including more than 28,000 well-characterized rat genes and UniGenes. The GeneChip HT Rat Focus Array Plate provides a subset of the proven content representing the best characterized genes found on the Rat Genome 230 2.0 Array in a convenient plate format designed to enable large-scale studies and reduce labor costs.

Both the Rat Genome 230 2.0 Array in cartridge format and the HT Rat Focus Array Plate are powerful tools for toxicology and neurobiology, as well as other applications using the rat as a model organism.

**Power of the Probe Set** — The key advantage of GeneChip® technology is that each high-density array contains multiple probe pairs per probe set, providing several independent measurements from every transcript.

### Applications

The rat is a principal model organism for studying human health and disease. In some instances, it provides the most relevant and convenient biological model for the study of specific pathways relevant to human biology. As a result, the rat plays a key role in toxicology as well as in physiological studies related to cardiac and vascular function, pulmonary circulation, metabolism, neurological control, age- and gender-related differences and studies related to hypertension and signal transduction<sup>1</sup>.

The GeneChip® Rat Genome 230 2.0 Array in cartridge format provides the entire transcribed rat genome on a single array. This enables scientists to obtain the most comprehensive view of the transcribed rat genome in order to draw accurate biological conclusions. GeneChip Rat Genome 230 2.0 Arrays in cartridge format have been used extensively for a wide variety of applications including the discovery of new target genes involved in cardiac ischemia, global analysis of gene expression in skeletal muscular activity, transcriptional profiling of liver disease and analysis of signaling pathways related to metabolism and development.

The GeneChip® HT Rat Focus Array Plate format provides a subset content representing the best characterized genes found on the GeneChip Rat Genome 230 2.0 Array. The HT Array Plate format greatly simplifies the management of running multiple microarrays in parallel, reducing labor cost and enabling increased standardization within studies and across multiple, geographically disparate sites.

The tremendous amount of information garnered from GeneChip brand microarrays provides the data necessary to build extensive quantitative databases which are important tools for toxicology studies and clinical development.

<sup>1</sup>National Center for Biotechnology Information

### GeneChip® Rat Genome 230 2.0 Array in Cartridge Format

The GeneChip® Rat Genome 230 2.0 Array in cartridge format is the first single array to provide comprehensive coverage of the transcribed rat genome.

- More than 31,000 probe sets analyze the expression level of more than 30,000 transcripts and variants from more than 28,000 well-characterized rat genes and UniGenes.
- The publicly available draft of the rat

**Figure 1:** GeneChip® Rat Genome Arrays shown in cartridge and HT plate formats.



genome and leading public rat databases were used to refine sequences, providing a higher-quality data output.

- Open-access bioinformatics tools available through the NetAffx™ Analysis Center allow rapid data interpretation and biologically meaningful results.

#### CONTENT PROFILE

Sequences used in the design of the cartridge format GeneChip Rat Genome 230 2.0 Array were selected from GenBank®, dbEST and RefSeq. The sequence clusters were created from the UniGene database (Build 99, June 2002) and then refined by analysis and comparison with the publicly available draft assembly of the rat genome from the Baylor College of Medicine Human Genome Sequencing Center (June 2002).

Oligonucleotide probes complementary to each corresponding sequence are synthesized *in situ* on the arrays. Eleven pairs of oligonucleotide probes are used to measure the relative transcription level of each sequence represented on the GeneChip Rat Genome 230 2.0 Array.

#### REAGENTS, INSTRUMENT AND SOFTWARE REQUIREMENTS

- Optimized reagents and standardized protocols available
- GeneChip® Scanner 3000, GeneChip® Scanner 3000 7G or GeneChip® Scanner 3000 7G Plus
- GeneChip® Operating Software (GCOS) v1.2 or higher

### GeneChip® HT Rat Focus Array Plate

The GeneChip® HT Rat Focus Array Plates are constructed to be spatially compatible with conventional 96-well plate formats and liquid-handling equipment.

- More than 24,000 probe sets analyze the expression level of over 16,000 well-substantiated rat genes and UniGenes.
- The publicly available draft of the rat genome and leading public rat databases were used to refine sequences, providing a higher quality of data output.

- Open-access bioinformatics tools available through the NetAffx™ Analysis Center allow rapid data interpretation and biologically meaningful results.

Two plate configurations are offered:

- GeneChip® HT Rat Focus 24-Array Plate – Three columns of eight pegs in each column for a total of 24 microarrays in one plate
- GeneChip® HT Rat Focus 96-Array Plate – all 12 columns of eight pegs in each column for a total of 96 microarrays in one plate

#### CONTENT PROFILE

Probe sets on the GeneChip® HT Rat Focus Array Plate are a subset of those present on the cartridge format Rat Genome 230 2.0 Array. Probe sets for the the best characterized genes were prioritized for inclusion on the array plate based upon a number of different criteria including overlap of the probe set target sequence to annotated full length mRNAs, EnsGene predicted mRNAs, UniGene clusters containing at least one full length mRNA or human and mouse fulllength mRNA syntenic alignments on the rat genome.

Oligonucleotide probes complementary to each corresponding sequence are synthesized *in situ* on the arrays. Similar to the cartridge format arrays, eleven pairs of oligonucleotide probes are used to measure the transcription level of each sequence represented on the GeneChip Rat Focus Array Plate.

Use the Power of the Probe Set and get multiple independent measurements for each transcript that deliver the greatest accuracy and reproducibility of any microarray platform.

#### REAGENTS, INSTRUMENT AND SOFTWARE REQUIREMENTS

- GeneChip® HT One-Cycle Target Labeling and Control Reagents
- GeneChip® Array Station
- GeneChip® HT Array Plate Scanner
- GeneChip® HT Software Suite, composed of:
  - GeneChip® Operating Software (GCOS) v1.2 or higher
  - HT Image Reader
  - HT Data Transfer Tool

### Normalization Controls<sup>2</sup>

All GeneChip® Rat Genome 230 Arrays (cartridge format) and HT Rat Focus Array Plates include the same set of constitutively expressed rat cellular maintenance genes to facilitate the normalization of array experiments. This set of normalization genes has demonstrated experimentally consistent levels of expression over a diverse set of tissues and serves as a tool to normalize data prior to performing data analysis.

<sup>2</sup> Affymetrix would like to acknowledge Gene Logic Inc. as the source of information that led Affymetrix to the determination of the algorithm used in the selection of the genes included in the Normalization Control Set.

#### RELATED PUBLICATIONS:

Fischer, M. D. *et al.* Expression profiling reveals metabolic and structural components of extraocular muscles. *Physiol Genomics* 9(2): 71-84 (2002).

Flamez, Daisy *et al.* Critical Role for Cataplerosis via Citrate in Glucose-Regulated Insulin Release. *Diabetes* 51(7): 2018-2024 (2002).

Grundschober, C. *et al.* Neurosecretion competence: A comprehensive gene expression program identified in PC12 cells. *Bio Chem* (2002).

National Center of Biotechnology Information <http://www.ncbi.nlm.nih.gov/>.

### Critical Specifications for GeneChip® Rat Genome 230 Arrays

	GeneChip® Rat Genome 230 2.0 Array in Cartridge Format	GeneChip® HT Rat Focus Array in Plate Format
Genes	>28,000	>16,000
Number of probe sets	>31,000	> 24,000
Feature size	11 µm	8 µm
Oligonucleotide probe length	25-mer	25-mer
Probe pairs/sequence	11	11
Control sequences included:		
Hybridization controls:	<i>bioB, bioC, bioD</i> and <i>cre</i>	<i>bioB, bioC, bioD</i> and <i>cre</i>
Poly-A controls:	<i>dap, lys, phe,</i> and <i>thr</i>	<i>dap, lys, phe,</i> and <i>thr</i>
Normalization control set:	100 probe sets	100 probe sets
Housekeeping/Control genes:	GAPDH, beta-Actin, hexokinase 1	GAPDH, beta-Actin, hexokinase 1
Detection sensitivity	1:100,000*	1:100,000*

\*As measured by detection of pre-labeled transcripts derived from mouse cDNA clones in a complex rat background.

### Supporting Products and Technical Literature for Manual Sample Labeling

Part Number	Product Name	Description
900493	GeneChip® One-Cycle Target Labeling and Control Reagents <sup>1</sup>	Sufficient for 30 reactions. Contains: <ul style="list-style-type: none"> <li>• IVT Labeling Kit</li> <li>• One-Cycle cDNA Synthesis Kit</li> <li>• Sample Cleanup Module</li> <li>• Poly-A RNA Control Kit</li> <li>• Hybridization Controls</li> </ul>
900494	GeneChip® Two-Cycle Target Labeling and Control Reagents <sup>1,2</sup>	Sufficient for 30 reactions. Contains: <ul style="list-style-type: none"> <li>• IVT Labeling Kit</li> <li>• Two-Cycle cDNA Synthesis Kit</li> <li>• Sample Cleanup Module</li> <li>• Poly-A RNA Control Kit</li> <li>• Hybridization Controls</li> </ul>

<sup>1</sup>Individual Kit components may be ordered separately.

<sup>2</sup>For the intermediate IVT step with unlabeled nucleotides, please order the MEGAscript® T7 Kit directly from Ambion.

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**Literature:** *GeneChip® Expression Analysis Technical Manual* (P/N 900365)

### Supporting Products and Technical Literature for Automated Sample Labeling

Part Number	Product Name	Description
900686	GeneChip® HT One-Cycle Target Labeling and Control Reagents <sup>1</sup>	Sufficient for 96 reactions. Contains: <ul style="list-style-type: none"> <li>• HT IVT Labeling Kit</li> <li>• HT One-Cycle cDNA Synthesis Kit</li> <li>• Poly-A RNA Control Kit</li> <li>• Hybridization Controls</li> </ul>

<sup>1</sup>HT Array Plate part numbers shown include reagent kit.

**Literature:** – *GeneChip® Expression Analysis Technical Manual for HT Array Plates Using the GeneChip® Array Station* (P/N 702063)  
 – *GeneChip® Expression Analysis Technical Manual for Cartridge Arrays Using the GeneChip® Array Station* (P/N 702064)

## Ordering Information

### GeneChip® Rat Genome 230 2.0 Arrays in Cartridge Format

#### GeneChip® Rat Genome 230 2.0 Arrays

- 900505** *Contains 2 Arrays*  
**900506** *Contains 6 Arrays*  
**900507** *Contains 30 Arrays*

### GeneChip® HT Rat Focus Array Plates

#### GeneChip® HT Rat Focus Array Plates

- 900975** *Contains 4 HT Rat Focus 24-  
Array Plates*  
**900974** *Contains 1 HT Rat Focus 96-  
Array Plate*

### GeneChip® HT Rat Focus Array Plates with Reagents

#### GeneChip® HT Rat Focus 24-Array Plate with Reagents\*

- 900977** *Contains 4 GeneChip® HT Rat  
Focus 24-Array Plates*  
*Contains 1 GeneChip® HT  
One-Cycle Target Labeling and  
Controls Kit, 96 Reactions*

#### GeneChip® HT Rat Focus 96-Array Plate with Reagents\*

- 900976** *Contains 1 GeneChip® HT Rat  
Focus 96-Array Plate*  
*Contains 1 GeneChip® HT  
One-Cycle Target Labeling and  
Controls Kit, 96 Reactions*

\*All trays necessary for array plate processing are packaged with HT plates listed above.

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