AFFYMETRIX®

Data Sheet

GeneChip® Human Genome U133 Arrays

The Most Comprehensive Coverage of the Human Genome in Two Flexible Formats: Single-array Cartridges and Multi-array Plates

Affymetrix provides microarrays for expression analysis with the most comprehensive coverage of the human genome. GeneChip® Human Genome U133 Arrays provide gene expression data for a multitude of applications, including:

- Uncovering new regulatory pathways
- Validating drug targets
- Understanding mechanisms of diseases
- Analyzing toxicological responses
- Discovering key biomarkers

Single-array Cartridge Format

Analyze the entire genome or focus on a targeted set of well-annotated genes with the genome.GeneChip® Human Genome U133 Plus 2.0 and GeneChip® Human Genome U133A 2.0 Array, respectively.

Multi-array Plate Format

Run multiple whole-genome microarrays in parallel, while reducing labor cost and increasing standardization with the genome. GeneChip® HT Human Genome U133 Array Plate Set.

Power of the Probe Set

The key advantage of genome. GeneChip® technology is that each high-density array contains multiple probe pairs per probe set, providing several independent measurements for every transcript.

Introduction

The family of GeneChip® Human Genome U133 (HG-U133) Arrays enables you to analyze gene expression across the whole genome or focus on a subset of well-characterized genes using either single array cartridges or multi-array plates. All HG-U133 rrays are based on the same genome content and use the same probe set strategy to measure gene expression levels accurately and comprehensively.

- GeneChip® Human Genome U133 Plus 2.0 Array (single array, cartridge format) - Analyze gene expression across the entire human genome for one sample
- GeneChip® Human Genome U133A 2.0 Array (single array, cartridge format) - Analyze gene expression of the best-characterized genes in the human genome for one sample
- GeneChip® HT Human Genome U133 Array Plate Set (multiple arrays, plate format) - Analyze gene expression across the entire human genome for up to 96 samples at a time

Content Relationship Between GeneChip® Human Genome Array Formats

GeneChip® Human Genome U133 Plus 2.0 Arrays cover more of the human genome than other HG-U133 microarrays; ~9,900 additional probe sets (the "Plus" content) are unique to the HG-U133 Plus 2.0. The HT Human Genome U133 Array Plate Set contains the majority of probe sets from the HG-U133 Plus 2.0 Array, with exception of "Plus" content. Plate A of the two-plate HT set covers the best characterized genes in the human genome. The probe sets on plate A are also represented on the GeneChip® Human Genome U133A 2.0 Array in cartridge format. The probe sets on plate B are the same as those found on the Human Genome U133B Array in cartridge format. More detailed information on the identity of the genes represented on each array can be found at the NetAffx™ Analysis Center (www.affymetrix.com/analysis/index.affx).

Figure 1: GeneChip® Human Genome U133 Arrays shown in cartridge and plate formats.

Oligonucleotide probes complementary to each corresponding sequence are synthesized *in situ* on the array. Eleven pairs of oligonucleotide probes are used to measure the relative transcription level of each sequence represented on all GeneChip® Human Genome U133 microarrays.

GeneChip® Human Genome U133 Plus 2.0 Array in Cartridge Format

The GeneChip® Human Genome U133 Plus 2.0 Array (HG-U133 Plus 2.0 Array) offers comprehensive analysis of genome-wide expression on a single array.

- Analyzes the relative expression level of more than 47,000 transcripts and variants, including more than 38,500 well-characterized genes and UniGenes.
- Offers an additional 9,900 probe sets, representing approximately 6,500 new genes, compared to the previous generation HG-U133 Set.
- Comprised of more than 54,000 probe sets and 1,300,000 distinct oligonucleotide features.

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® Human Genome U133A 2.0 Array in Cartridge Format

The GeneChip® Human Genome U133A 2.0 Array (HG-U133A 2.0 Array) is a single array representing over 14,500 well-characterized human genes that can be used to explore human biology and disease processes.

- Analyzes the relative expression level of more than 18,400 transcripts and variants, including more than 14,500 well-characterized human genes.
- Comprised of more than 22,000 probe sets and 500,000 distinct oligonucleotide features.

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 Human Genome U133 Array Plate Set

The GeneChip® HT Human Genome U133 Array Plate Set (HT HG-U133 Array Plate Set) provides comprehensive coverage, on two arrays, of the transcribed human genome in a convenient plate format. The plates are constructed to be spatially compatible with conventional 96-well plate formats and liquid-handling equipment. This configuration is designed to address the needs of large-scale experiments by greatly simplifying the management of multiple microarrays run in parallel, reducing labor costs and enabling increased standardization within studies and across sites.

- Provides comprehensive coverage of the transcribed human genome on a two-plate set[1].
- Analyzes the relative expression level of more than ~39,000 transcripts and variants, including more than 33,000 well-characterized genes and UniGenes.
- Combined content of the two plates comprises more than 45,000 probe sets and 1 million distinct oligonucleotide features.
- Interrogates up to 96 distinct samples at one time.
- Increases convenience and standardization to efficiently conduct large-scale experiments.

The GeneChip HT Human Genome U133 Array Plate Set is a two-plate set that includes both the GeneChip HT Human Genome U133A Array Plate and the GeneChip HT Human Genome U133B Array Plate. Individually, single arrays from each plate contain the same probe sets as those represented on the cartridge format HG-U133A Array and HG-U133B Array, respectively. For each plate, two configurations are offered:

- 24-Array Plate - 24 HT HG-U133A or HT HG-U133B microarrays are positioned on a single plate of 24 pegs for simultaneous processing and analysis
- 96-Array Plate - 96 HT HG-U133A or HT HG-U133B microarrays are positioned on a single plate of 96 pegs for simultaneous processing and analysis

1 The Plus content found on the GeneChip Human Genome U133 Plus 2.0 Array in cartridge format is not present on the GeneChip HT Human Genome U133 Array Plate Set.

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 Software
  - HT Data Transfer Tool

Normalization Controls

All GeneChip® Human Genome U133 Arrays include a set of constitutively expressed human maintenance genes to facilitate the normalization of array experiments. These probe sets are identical across all Human Genome Arrays. This set of normalization genes has demonstrated

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experimentally consistent levels of expression over a diverse set of tissues and serves as a tool to normalize your data prior to performing data analysis.

Content Profile for All Human Genome U133 Arrays

The probe sets represented on all GeneChip® Human Genome U133, U133 2.0 and U133 Plus 2.0 Arrays were selected from sequences in GenBank®, dbEST and RefSeq. The sequence clusters were created from the UniGene database (Build 133, April 20, 2001) and then refined by analysis and comparison with a number of other publicly available databases, including the Washington University EST trace repository and the University of California, Santa Cruz Golden-Path human genome database (April 2001 release).

The 9,921 additional probe sets found exclusively on the HG-U133 Plus 2.0 Array (referred to as "Plus" content) were selected from sequences in GenBank, dbEST and RefSeq. Sequence clusters were created from Build 159 of the UniGene database (January 25, 2003) and refined by analysis and comparison with a number of other publicly available databases, including the Washington University EST trace repository and the NCBI human genome assembly (Build 31).

The HG-U133A 2.0 Array contains a targeted subset of the content from the GeneChip Human Genome U133 Plus 2.0 Array, representing the best annotated genes found in UniGene Build 133 (2001). This identical best annotated subset is also found on the GeneChip HT Human Genome U133A Array Plate. More detailed information on the identity of the genes represented on each array can be found at the NetAffx™ Analysis Center (www.affymetrix.com/analysis/index.affx). Probe sets represented on the GeneChip Human Genome U133 Plus 2.0 Array in cartridge format are replicated across the GeneChip HT Human Genome U133 Array Plate Set.

RELATED PUBLICATIONS

Cousins, R. J., *et al.* A global view of the selectivity of zinc deprivation and excess on genes expressed in human THP-1 mononuclear cells. *Proceedings of the National Academy of Sciences of the United States of America* **100**(12), 6952-7 (2003).

Williams, K. L., *et al.* Cutting edge: monarch-1: a pyrin/nucleotide-binding domain/leucine-rich repeat protein that controls classical and nonclassical MHC class I genes. *Journal of Immunology* **170**(11), 5354-8 (2003).

Soon, L. L., *et al.* Overexpression of WISP-1 down-regulated motility and invasion of lung cancer cells through inhibition of Rac activation. *Journal of Biological Chemistry* **278**(13), 11465-70 (2003).

Cartridge Format	
HG-U133 Plus 2.0 Array and HG-U133 A 2.0 Array	GeneChip® Scanner 3000, GeneChip® Scanner 3000 7G or GeneChip® Scanner 3000 7G Plus GeneChip Operating Software (GCOS) v1.2 or higher
HT Array Plate Format	
HT HG-U133 Array Plate Set	GeneChip® HT Array Plate Scanner GeneChip® Array Station GeneChip HT Software Suite, composed of – GeneChip Operating Software (GCOS) v1.2 or higher – HT Image Reader – HT Data Transfer

*GeneChip Scanner 3000 High-Resolution Update is standard on all instruments shipped starting in September, 2003 with serial number series 502. Previous versions, serial number series 501, will require the 00-0110 GeneChip Scanner 3000 High-Resolution Update to be installed.

Critical Specifications for GeneChip® Human Genome Products

	Cartridge Format		Plate Format	
	Human Genome U133 Plus 2.0 Array	**Human Genome U133A 2.0 Array**	**Human Genome U133 A Array Plate**	**Human Genome U133 B Array Plate**
Number of transcripts	~47,400	~18,400	~18,400	~20,600
Number of genes	>38,500	>14,500	>14,500	>18,500
Number of probe sets	>54,000	>22,000	>22,000	>22,000
Feature size	11 µm	11 µm	8 µm	8 µm
Oligonucleotide probe length	25-mer	25-mer	25-mer	25-mer
Probe pairs/sequence	11	11	11	11
Control sequences included:				
Hybridization controls	*bioB, bioC, bioD, cre*	*bioB, bioC, bioD, cre*	*bioB, bioC, bioD, cre*	*bioB, bioC, bioD, cre*
Poly-A controls	*dap, lys, phe, thr*	*dap, lys, phe, thr*	*dap, lys, phe, thr*	*dap, lys, phe, thr*
Normalization control set	100 probe sets	100 probe sets	100 probe sets	100 probe sets
Housekeeping/Control genes	GAPDH, beta-Actin, ISGF-3 (STAT1)	GAPDH, beta-Actin, ISGF-3 (STAT1)	GAPDH, beta-Actin, ISGF-3 (STAT1)	GAPDH, beta-Actin, ISGF-3 (STAT1)
Detection sensitivity	1:100,000*	1:100,000*	1:100,000*	1:100,000*

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

Supporting Products

Part Number	Product Name	Description
900493	One-Cycle Target Labeling and Control Reagents[1]	Sufficient for 30 reactions Contains: • IVT Labeling Kit • One-Cycle cDNA Synthesis Kit • Sample Cleanup Module • Poly-A RNA Control Kit • Hybridization Controls
900494	Two-Cycle Target Labeling and Control Reagents[1,2]	Sufficient for 30 reactions Contains: • IVT Labeling Kit • Two-Cycle cDNA Synthesis Kit • Sample Cleanup Module • Poly-A RNA Control Kit • Hybridization Controls
900686*	GeneChip® HT One-Cycle Target Labeling and Control Reagents[1]	Sufficient for 96 reactions Contains: • HT IVT Labeling Kit • HT One-Cycle cDNA Synthesis Kit • Poly-A RNA Control Kit • Hybridization Controls

[1] Individual Kit components may be ordered separately.
[2] For the intermediate IVT step with unlabeled nucleotides, please order the MEGAscript® T7 Kit directly from Ambion.
** For automated sample labeling*

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Ordering Information

GeneChip® Human Genome Arrays

Cartridge Format:

Human Genome U133 Plus 2.0 Array

900470 Contains 2 Arrays
900466 Contains 6 Arrays
900467 Contains 30 Arrays

Human Genome U133A 2.0 Array

900471 Contains 2 Arrays
900468 Contains 6 Arrays
900469 Contains 30 Arrays

HT Array Plate Format:

900750 **HT Human Genome U133A 24-Array Plate**
Contains 4 HT HG-U133A 24-Array Plates

900751 **HT Human Genome U133A 96-Array Plate**
Contains 1 HT HG-U133A 96-Array Plate

901042 **HT Human Genome U133B 24-Array Plate**
Contains 4 HT HG-U133B 24-Array Plates

901043 **HT Human Genome U133B 96-Array Plate**
Contains 1 HT HG-U133B 96-Array Plate

901078 **HT Human Genome U133 24-Array Plate Set**
Contains 4 HT HG-U133A 24-Array Plates
Contains 4 HT HG-U133B 24-Array Plates

901077 **HT Human Genome U133 96-Array Plate Set**
Contains 1 HT HG-U133A 96-Array Plate
Contains 1 HT HG-U133B 96-Array Plate

GeneChip® HT Human Genome U133 Array Plates with Reagents:

HT Human Genome U133 24-Array Plate Set with Reagents*

901080 Contains 4 HT HG-U133A 24-Array Plates
Contains 4 HT HG-U133B 24-Array Plates
Contains 1 HT One-Cycle Target Labeling and Control Kit, 96 Reactions

HT Human Genome U133 96-Array Plate Set with Reagents*

901079 Contains 1 HT HG-U133A 96-Array Plate
Contains 1 HT HG-U133B 96-Array Plate
Contains 1 HT One-Cycle Target Labeling and Control Kit, 96 Reactions

HT Array Plate Format:

HT Human Genome U133A 24-Array Plate with Reagents*

900832 Contains 4 HT HG-U133A 24-Array Plates
Contains 1 HT One-Cycle Target Labeling and Control Kit, 96 Reactions

HT Human Genome U133A 96-Array Plate with Reagents*

900833 Contains 1 HT HG-U133A 96-Array Plate
Contains 1 HT One-Cycle Target Labeling and Control Kit, 96 Reactions

HT Human Genome U133B 24-Array Plate with Reagents*

901048 Contains 4 HT HG-U133B 24-Array Plates
Contains 1 HT One-Cycle Target Labeling and Control Kit, 96 Reactions

HT Human Genome U133B 96-Array Plate with Reagents*

901049 Contains 1 HT HG-U133B 96-Array Plate
Contains 1 HT One-Cycle Target Labeling and Control Kit, 96 Reactions

*All trays necessary for array plate processing are packaged with HT Array Plates listed above.

Affymetrix® products can be purchased directly from Affymetrix in the United States, many European countries, and many Asian countries. For all other territories, please view a list of our distribution partners, which can be located at: http://www.affymetrix.com/site/contact/index.affx.

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