affymetrix
Biology for a better world

GeneChip® Human Transcriptome Array 2.0

Highest resolution microarray for gene expression profiling of all transcript isoforms

Research has shown that the tens of thousands of human genes contain hundreds of thousands of exons, which produce hundreds of thousands of different transcript isoforms. These transcript isoforms are produced when the exons of a gene may be included within, or excluded from, the final, processed messenger RNA produced from that gene. The five basic modes of alternative splicing include:

- Exon skipping
- Mutually exclusive exons
- Alternative 5' donor sites
- Alternative 3' acceptor sites
- Intron retention

Until now, measuring and analyzing these transcript isoforms has been nearly impossible due to technology limitations, sample input requirements, and lack of analysis capabilities/tools.

Affymetrix' new GeneChip® Human Transcriptome Array 2.0 has been designed to eliminate these technology and analysis hurdles. This high-resolution array design contains >6.0 million distinct probes covering coding and non-coding transcripts. 70% of the probes on this array cover exons for coding transcripts, and the remaining 30% of probes on the array cover exon-exon splice junctions and non-coding transcripts. The unparalleled coverage of this array provides the deepest insight available into all coding and non-coding transcripts available.

To ensure uniform coverage of the transcriptome, GeneChip Human Transcriptome Array 2.0 was designed with approximately ten probes per exon and four probes per exon-exon splice junction. This coverage ensures that you will obtain complete, accurate, and reproducible data with every experiment.

In order to make the analysis of this vast amount genetic data seamless, the probes are all arranged into probe sets that translate and summarize your data into gene-level, exon level, and splice-junction probe sets. The CEL files generated by these arrays are compatible with Affymetrix Expression Console™ Software (version 1.3) to enable simple data analysis.

In order to make the vast amount of data generated useful, Affymetrix has developed Affymetrix® Transcriptome Analysis Console (TAC) Software, which aids in the visualization of your data and provides you with the capability to easily visualize expression changes at the gene and exon level as well as drill down into alternatively spliced exons.

GeneChip Human Transcriptome Array 2.0 was designed to aid in human disease research and clinical translational medicine by providing the most comprehensive view of the transcriptome offered in a commercial microarray and by supporting analysis solutions that take you to biologically meaningful results in days rather than months.

Benefits of GeneChip Human Transcriptome Array 2.0:

>285,000 full-length transcripts covered

- >245,000 coding transcripts
- >40,000 non-coding transcripts
- >339,000 probe sets covering exon-exon junctions

Data from multiple sources compiled and curated to:

- Reduce redundant probe sets
- Formulate the most comprehensive gene models available

Integrated solution for exon-level analysis

- Seamless integration of both the laboratory workflow and bioinformatics analysis in one solution

Measure alternative splicing events/transcript variants

- Probes designed to maximize exon coverage enable you to measure all transcript isoforms

Confidence in your results

- Reproducible: Intra-lot correlation coefficient ≥0.99
- <6.5% coefficient of variation observed for all tissues tested

Obtain meaningful results with both clinical and non-clinical samples

- Including FFPE and fresh frozen samples

Array content summary

Array protein coding content	No.
Genes (transcript clusters)	44,699
Transcripts	245,349
Exons	560,472
Exon clusters	296,058

Array non-protein coding content	No.
Genes (transcript clusters)	22,829
Transcripts	40,914
Exons	109,930
Exon clusters	82,444

Controls	
ERCC probe set[1,2]	63
Background probes	Antigenomic set
Poly-A controls[2]	*dap, lys, phe, thr*
Hybridization controls	*bioB, bioc, bioD, creX*

[1] Probe sets interrogating external RNA controls present in the Ambion® ERCC RNA Spike-In Control Mixes, P/N 4456740 and 4456739.

[2] This array contains probe sets for both ERCC and Poly-A spike in-controls. Sequence homology between the two control mixes will result in cross-hybridization of target to the control probes on the array. It is important to use only one control probe set when processing the array (ERCC or Poly-A controls) but not both.

Data sources used to design and annotate the array

RefSeq
Ensembl
UCSC (known genes and lincRNA transcripts)
Vertebrate Genome Annotation (Vega) database
Mammalian Gene Collection (MGC) (v10)
www.noncode.org
lncRNA db
Broad Institute, Human Body Map lincRNAs and TUCP catalog

Specifications

Sensitivity	≥1:100,000 (≥1.5 pM)
Correlation coefficient (intra-lot)	≥0.99
Detectable fold change	2-fold for 1:100,000 vs. 1:50,000
Dynamic range	~3 logs
Total RNA input required	50–500 ng
Probe feature size	5 µm
Probe length	25-mer
Average probes per gene[1,2]	109
Probes per exon[2] (median)	10
Probes per splice junction (median)	4
Interrogated strand[3]	Sense
Hybridization volume	200 µl
Fluidics script	FS450_0001

[1] Single and double exon genes were brought up to a minimum of 30 probes total per gene.

[2] Single exon transcript clusters contain a median of 20 probes per exon.

[3] The probes tiled on the array are designed in the anti-sense orientation, requiring sense-strand labeled targets to be hybridized to the array.

Ordering information

Part number	Description	Details
902233	GeneChip® Human Transcriptome Array 2.0	Contains 2 arrays
902162	GeneChip® Human Transcriptome Array 2.0	Contains 10 arrays
902309	Kit, GeneChip® Human Transcriptome Array 2.0 and GeneChip® WT PLUS Reagent Kit, 10 samples	Sufficient for 10 reactions
902310	Kit, GeneChip® Human Transcriptome Array 2.0 and GeneChip® WT PLUS Reagent Kit, 30 samples	Sufficient for 30 reactions
902311	Kit, GeneChip® Human Transcriptome Array 2.0 and SensationPlus™ FFPE Amplification and WT Labeling Kit, 12 samples	Sufficient for 12 reactions
902312	Kit, GeneChip® Human Transcriptome Array 2.0 and SensationPlus™ FFPE Amplification and WT Labeling Kit, 24 samples	Sufficient for 24 reactions

Related products

Part number	Description	Details
900720	GeneChip® Hybridization, Wash, and Stain Kit	Sufficient for 30 reactions

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