CodeLink Mouse Whole Genome Bioarray

~36,000 mouse gene targets for genome-wide expression profiling

The CodeLink™ Mouse Whole Genome Bioarray offers coverage of the mouse genome for comprehensive genome-wide gene expression analysis on a single bioarray (Fig 1). CodeLink™ Mouse Whole Genome Bioarray targets ~36,000 transcripts and ESTs, including over 30,000 well substantiated mouse genes. This bioarray is fully integrated with the CodeLink™ Expression Bioarray System of optimized reagents, protocols, processing tools, and software for ease of use and superior performance. Key performance features include:

• Accurate and reproducible biological results. For best results from every bioarray experiment, ~36-000 quality probes were designed and experimentally tested for performance. In addition, advanced non-contact deposition robots and Six Sigma based manufacturing processes ensure that every CodeLink™ bioarray complies to design and quality specifications.

• High assay sensitivity and specificity. An improved and proprietary 3-D aqueous gel matrix ensures enhanced interaction between probe and target, simulating liquid phase hybridization kinetics. With this high-density matrix, sensitivity of detection is as low as 1:2,000,000 mass ratio, determined by spiking experiments at the cRNA level (Table 1 and Fig 2). This superior detection capability yields enhanced detection of low abundance transcripts.

Fig 1. CodeLink™ Mouse Whole Genome Bioarrays are packaged with a unique Flex Chamber that allows simple setup, easy loading of target, and solution mixing for improved hybridization efficiencies. Optimized matrix chemistry and non-contact deposition robotics results in excellent spot morphology and increased density.

CodeLink Whole Genome Bioarray performance

	Typical performance	*Benefit*
Sensitivity	Mass ratio < 1:1,000,000 with bacterial spiking into cRNA or total RNA level (Fig 2)	Detection of more low abundance transcripts (< 0.3 copies per cell)
Dynamic range	Linear signal response across three orders of magnitude (0.05 pM – 50 pM) (Fig 2)	More usable/accurate data across a broad range of gene expression levels
Specificity	Discrimination of > 2 base Mismatches (≥90%)	Better discrimination of highly homologous genes
Signal reproducibility	Typically < 15% total median CV among prod-uction batches, all probes included; ~8% median CV among production batches, for probes above noise	Reproducible differential expression results in every experiment (Fig 3 and Fig 4)
Minimum detectable fold change	> 98% within two-fold change for replicates	Reduced noise for increased detection of small changes in gene expression, and more usable data per bioarray (Fig 3 and Fig 4)

Table 1. CodeLink™ Whole Genome Bioarray observed performance specifications.

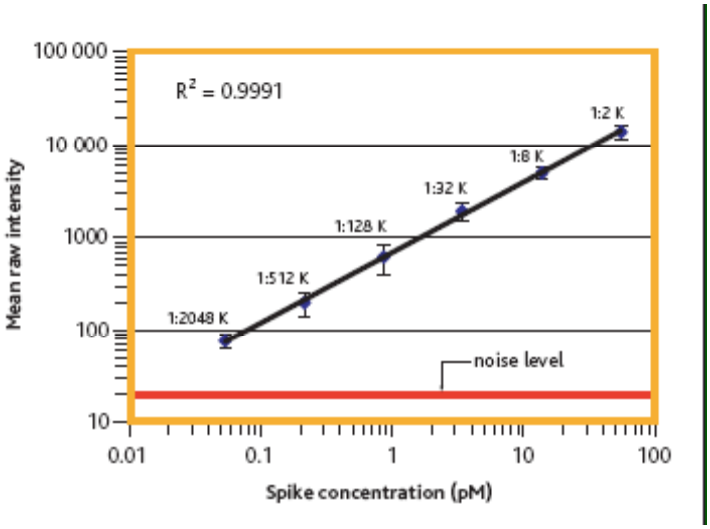


Fig 2. CodeLink™ Whole Genome Bioarrays demonstrate high sensitivity of low to high-fold change determination in gene expression, and transcript detection down to ~1:2,000,000 mass ratio determined by positive control spiking experiments at the cRNA level. Total dynamic range shown is 0.05-50 pM spike concentration range.

~36,000 Mouse transcripts
represented in a single experiment

Mice exhibit high similarity to many human biological pathways, making it a key model system for human physiological and toxicological studies in drug discovery applications. The CodeLink™ Mouse Whole Genome Bioarray is designed to interrogate approximately 36,000 transcripts representing most of the known and predictive genes of the mouse genome. Each transcript is represented by a 30-mer probe which is designed to conserved exons across the transcripts of targeted genes (Table 2). The probe sequences, representing well annotated, full length and partial mouse gene sequences, were designed based on sequences selected from the NCBI UniGene build #139, RefSeq database (April 1, 2004 release) and dbEST database (July 31, 2004 release) (Table 3). Well-annotated mRNA or coding sequences were chosen to ensure usefulness for a large range of applications in basic research, biotechnology, and drug development. Each sequence was carefully screened to ensure high-quality, specific probe design, and to reduce redundancy of gene targets. All of the probes designed to these sequences were functionally tested, and over 97% were functionally validated against 14 mouse tissues to ensure best representation of the gene and biologically relevant results.

CodeLink Mouse Whole Genome Bioarray specifications	
Number of arrays in set	1
Number of probes	35,587 (Total) 34,967 (**Unique** sequences)
Number of transcripts	36,142
Number of discovery genes	34,967*
Positive controls	300
Negative controls	320
Housekeeping genes	~50
Number of probes per gene	**One specific &** functionally validated probe
Oligonucleotide probe length	30-mer probe
Probe proximity to 3' end	90% within 550 bases; average distance of 289 bases
RNA sample input	0.1–2 µg total RNA
Type of assay	One color
Storage and handling temperature	Room temperature

*Number of probes targeting transcripts other than controls.

Table 2. CodeLink™ Mouse Whole Genome Bioarray specifications.

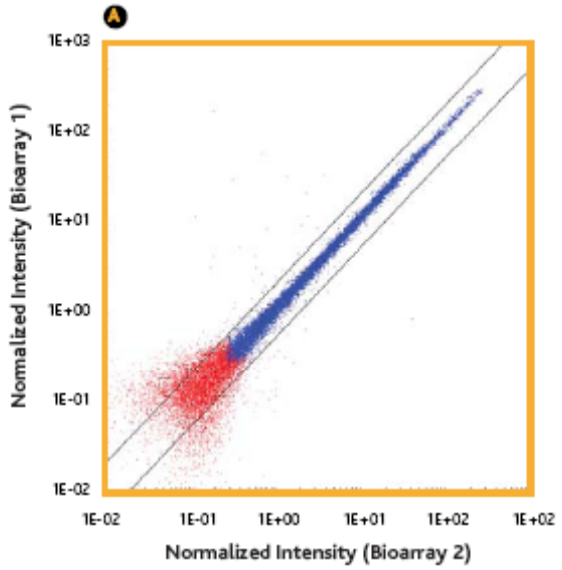
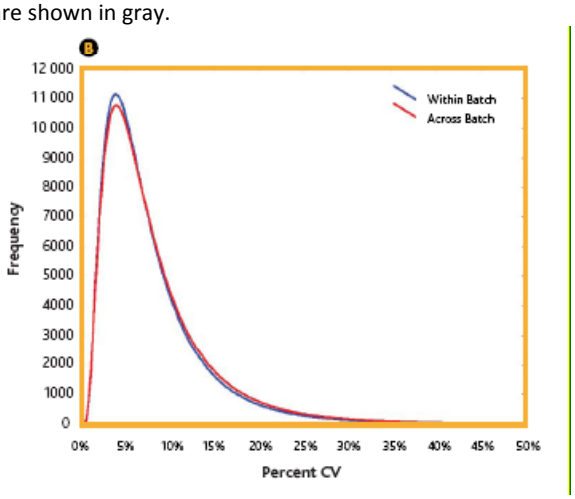


Fig 3. CodeLink™ Mouse Whole Genome Bioarrays exhibit excellent array-to array signal intensity reproducibility. A. The plotted normalized probe signals from two independent CodeLink™ Mouse Whole Genome Bioarrays— each run with 10 µg of the same labeled brain cRNA target—are shown here. Between these two bioarrays, 99.6% of all probes with "good" signals were within two-fold of each other. The dark blue data points represent the concordantly "good" probes (G); the bright pink data points represent the non-concordantly "good" probes (G and L); and the light pink data points represent the concordantly "absent" probes (L). The two-fold lines are shown in gray.



B. CodeLink™ Mouse Whole Genome Bioarrays exhibit excellent reproducibility within and across bioarray production batches as represented by median % CV. These data were generated using one brain cRNA sample on three replicate arrays from one production batch (within batch, blue), and one array from each of three production batches (across batch, red).

CodeLink Mouse Whole Genome Bioarray probe distribution	
Unique NCBI accession numbers	36,142
Unique UniGene IDs	30,733
Unique RefSeq IDs	15,523
Unique Locus Link IDs	19,633
Ensembl genes	15,634

Table 3. CodeLink™ Mouse Whole Genome Bioarray content source and representation of public databases.

As a result of their high-quality probe content and design, CodeLink™ Mouse Whole Genome Bioarrays can be reliably used for many applications, including genome-wide analysis of gene expression, transcriptional profiling of disease, discovery of new target genes, and analysis of pathways related to metabolism and development.

Back-compatible data

For flexibility and data preservation, CodeLink™ Mouse Whole Genome Bioarrays are compatible with lower density CodeLink™ mouse bioarrays. This means that existing data from CodeLink™ UniSet™ Mouse 20K Bioarrays can be continuously used in future studies along with newly generated data from CodeLink™ Mouse Whole Genome Bioarrays (Fig 4).

CodeLink Expression Bioarray System

As part of the CodeLink™ Expression Bioarray System (Fig 5), CodeLink™ Mouse Whole Genome Bioarrays are compatible with existing instruments, reagents, software, and accessories.

• The CodeLink™ iExpress Assay Reagent Kit provides the required reagents and an easy-to-follow protocol for target preparation, including cDNA synthesis and *in vitro* transcription. This high yield reagent kit produces sufficient amplified material for multiple replicate experiments from as little as 0.1-2 µg total RNA.

• The new CodeLink™ Gene Expression Analysis software v5.0 supports all current CodeLink™ bioarrays, including new CodeLink™ Whole Genome Bioarrays, as well as focused bioarrays on the iExpress multi-assay format This latest software version continues to provide accurate data extraction and integratration with manufacturing quality control information and gene annotation, with spot-finding and primary data analysis. In addition, analysis reports have been improved and expanded. Data generated with CodeLink™ Gene Expression Analysis software v5.0 is back-compatible with data generated with previous software versions.

• A complete line of accessories, including parallel processing and hybridization tools, is available for use with the CodeLink™ Mouse Whole Genome Bioarray.

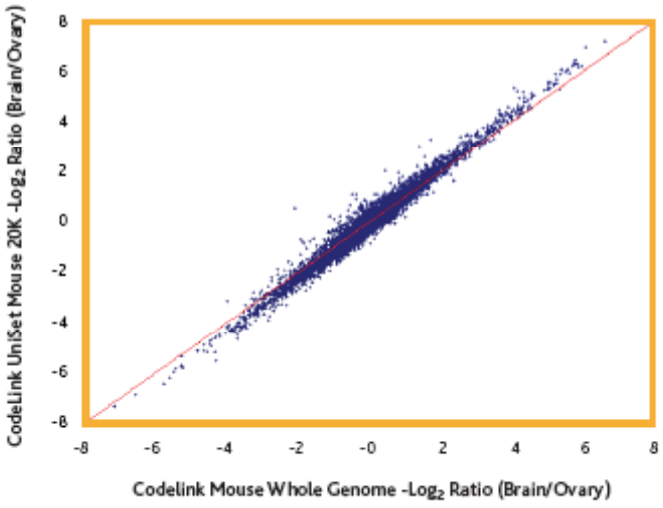


Fig 4. CodeLink™ Mouse Whole Genome Bioarrays generate data that is back-compatible to corresponding data from CodeLink UniSet Mouse 20K Bioarrays. The differential expression ratios of brain to ovary show high concordance between the two CodeLink™ Bioarray platforms. The normalized probe signals from two bioarrays of each CodeLink™ product and of each cRNA target (brain and ovary) were averaged separately. The brain:ovary ratios of these mean normalized signals were then calculated for each product: CodeLink™ Mouse Whole Genome Bioarray and CodeLink™ UniSet Mouse 20K Bioarray. The $\log_2$ of those ratios from the two products' overlapping subset of probes are shown here. The dark blue data points represent the ratios generated from only concordantly "good" probes (G) on all of the bioarrays (n = 9559 ratios). The red line illustrates a slope of 1.

Fig 5. The CodeLink Mouse Whole Genome Bioarray is fully integrated with the CodeLink Bioarray System.

Ordering information

Description	Size	Code number
CodeLink Mouse Whole Genome Bioarray	**6/pack**	**300033-6pk**
CodeLink iExpress Assay Reagent Kit	**24 reactions**	**67601000**
Universal Shaker Kit	**12 slides**	**310031**
Expression Parallel Processing Kit	**12 slides**	**310010**
Cy™5-Streptavidin for Microarrays	**1 mg**	**28900224**
CodeLink™ Gene Expression Analysis v5.0 software		**310035**

For further information, please contact the Applied Microarrays, Inc. sales office below

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