



# RatRef-12 Expression BeadChip

The RatRef-12 Expression BeadChip with IntelliHyb™ Seal allows researchers to generate genome-wide expression profiles for twelve samples in parallel on a single BeadChip, with outstanding performance and industry-leading pricing.

## INTRODUCTION

The RatRef-12 Expression BeadChip includes twelve genome-scale, gene expression microarrays built using Illumina's unique multi-sample Array of Arrays™ format (Figure 1). BeadChip content (22,523 probes per array) was selected from the National Center for Biotechnology Information (NCBI) Reference Sequence (RefSeq) database<sup>1</sup>. The RatRef-12 BeadChip is part of a complete gene expression solution that includes instrumentation, analysis software, reagent kits, and access to an extended family of bead-based array products.

## ARRAY CONTENT

Content for the RatRef-12 Expression BeadChip is based largely on RefSeq content (Release 16).

### HIGHLIGHTS OF THE RATREF-12 EXPRESSION BEADCHIP

- Confidence in the Results: outstanding data quality and 100% hybridization-based array QC
- Trusted Content: designed using the NCBI RefSeq database, Release 16
- High-Throughput Ready: 12-sample BeadChip ideal for high-throughput applications
- Freedom to Expand Scope: more samples for less than 1/2 the cost of other arrays
- Easy to Use: improved coverseal technology using IntelliHyb Seal for faster processing

To create BeadChip content, Illumina scientists designed 50mer sub-sequences based on the RefSeq database.

## PROBE DESIGN ALGORITHMS

Each address and probe sequence combination has been carefully selected bioinformatically. Gene-specific probes were designed using a multi-step algorithm that scored the following parameters:

- Uniqueness
- Absence of highly repeated sequences in the genome
- Sequence complexity
- Self-complementarity for hairpin structure prediction
- Melting temperature for hybridization uniformity
- Distance from the 3' end of the transcript

## PERFORMANCE

BeadChip performance has been tested for fundamental assay dose-response characteristics by techniques previously described<sup>2,3</sup>. Performance specifications are listed in Table 1.

## EFFICIENT BEADCHIP DESIGN

Illumina's RatRef-12 Expression BeadChip incorporates the IntelliHyb seal, adding efficiency to processing. The improved coverseals and twelve-sample format are ideal for high-throughput applications.

FIGURE 1: RATREF-12 EXPRESSION BEADCHIP



The RatRef-12 Expression BeadChip with IntelliHyb Seal contains 12 rat-specific whole-genome gene expression arrays, allowing 12 samples to be hybridized to a single chip. Each array probes 21,910 genes and contains 22,523 probes.

## RAT WHOLE-GENOME SOLUTION

Illumina's efficient BeadChip design with IntelliHyb Seal enables effective multi-sample experimentation, while low-volume hybridization and a low price point support cost effectiveness. Illumina's Whole-Genome Expression Solution, from BeadChips to BeadStudio analysis software, is ideal for investigation of rat genome gene expression. Low-sample input and high-quality data with 100% QC on every feature comprise the most comprehensive solution currently available to researchers who are using the rat as a model organism.

ORDERING INFORMATION

PART NO.	PRODUCT	DESCRIPTION
<b>BD-27-303</b>	RatRef-12 Expression Beadchip (24 samples)	Two RatRef-12 BeadChips, each containing 22,523 probes, to query expression profiles of the rat genome. Includes hybridization buffers, wash buffers, and wash trays for 24 samples.
<b>BD-27-302</b>	RatRef-12 Expression Beadchip (72 samples)	Six RatRef-12 BeadChips, each containing 22,523 probes, to query expression profiles of the rat genome. Includes hybridization buffers, wash buffers, and wash trays for 72 samples.
<b>BD-27-301-CSE</b>	Customer Sample Evaluation	Illumina scientists run up to 22 customer samples using a RatRef-12 Expression BeadChip. All standard data output files is supplied to the customer.
RELATED PRODUCTS		
<b>UG-10-301</b>	IntelliHyb GEX Hyb Chamber Set	Hyb chamber upgrade kit for use with RatRef-12 Gene Expression BeadChips with IntelliHyb Seals. Includes Hyb Chamber, Hyb Chamber Gasket, four Hyb Chamber BeadChip Inserts, and rocker plate oven insert.
<b>BD-60-503</b>	Rocker Attachment for Hybridization Oven	Rocker unit for the Hybridization Oven, used with Infinium Whole-Genome Genotyping and Whole-Genome Gene Expression.
<b>IL1791</b>	Illumina Total Prep™ RNA Amplification Kit	Available from Ambion (www.ambion.com)
<b>BD-20-104</b>	Direct Hybridization Buffer Kit for IntelliHyb Seal	Buffer kit for use with RatRef-12 Expression BeadChips with IntelliHyb Seal. Includes sufficient hybridization buffer, wash buffer, and trays for six BeadChips.

TABLE 1: PRODUCT SPECIFICATIONS

Specification	Value
Probe Length	full-length 50mer gene-specific probe plus 29mer address sequence <sup>a</sup>
Probes	22,523
Sensitivity <sup>b,c</sup>	≤ 1:250,000
Dynamic Range <sup>b,d</sup>	≥ 3 logs
Precision <sup>b,e</sup>	≤ 1.35 fold
Starting Material <sup>f</sup>	50-100 ng
Hybridization Volume	15 µl

<sup>a</sup> The address sequence is used to map and decode the array  
<sup>b</sup> Determined by spiking experiments in a labeled rat RNA background using pre-labeled heterologous targets of defined concentration  
<sup>c</sup> 99% confidence  
<sup>d</sup> Defined as the concentration range over which concentration changes of ≤ 2-fold can be determined with 95% confidence  
<sup>e</sup> Median measurement precision within the dynamic range, 95% confidence  
<sup>f</sup> Total RNA with a single round of IVT amplification; range may vary based on input material source and quality

REFERENCES

- (1) For NCBI RefSeq information, visit <ftp://ftp.ncbi.nih.gov/refseq/release/>.
- (2) K Kuhn, SC Baker, E Chudin, M Lieu, S Oeser, H Bennet, P Rigault, T McDaniel, M Chee (2004) A novel, high-performance random array platform for quantitative gene expression profiling. Genome Research 14: 2347-2356.
- (3) Whole-genome gene expression analysis using the Sentrix® Human-6 and HumanRef-8 Expression BeadChips. Pub. No. 470-2005-004 at [www.illumina.com](http://www.illumina.com).

ADDITIONAL INFORMATION

To learn more about the RatRef-12 Expression BeadChip, visit our website or contact us.

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