Illumina VeraCode™ Technology

The Illumina BeadXpress™ reader and VeraCode technology support rapid detection and analysis with a wide range of flexible multiplex assays.

Introduction

Illumina's VeraCode technology advances molecular testing to the digital age. Based on digitally encoded microbeads, this technology platform represents a digital revolution for multiplex testing in genotyping, gene expression, and protein-based assays. VeraCode technology offers many distinct advantages, including:

- **Unsurpassed Multiplexing Range**
- **Robust Performance**
- **Assay Versatility**
- **Rapid Sample Throughput**
- **Low-Cost Assays**

Veracode Technology

VeraCode technology uses cylindrical glass microbeads measuring 240 microns in length by 28 microns in diameter. Using Illumina's proprietary technology, digital holographic elements are precisely embedded within each microbead. When excited with a laser, the bead emits a unique code image, allowing for quick, specific detection (Figure 2-3).

Assay Flexibility

VeraCode technology combines pools of uniquely coded beads for easy and inexpensive multiplexing in solution-based assays. Bead replicates for each bead type ensures robust assays and industry-leading data quality. VeraCode beads are highly stable and the digital coding provides customizable tracking of multiplex assay markers and critical identifiers such as sample ID, laboratory ID, and reagent kits.

The glass surface of the VeraCode bead is ideal for a multitude of bioassays. Illumina has developed VeraCode bead products with unique surface chemistries and biocapture molecules, enabling easy development of nucleic acid and protein-based assays to support a broad range of applications. Illumina scientists leveraged the company's experience with bead-based products to deliver robust assays that span multiplex levels ranging from a single target to several hundred targets per sample in a single well.

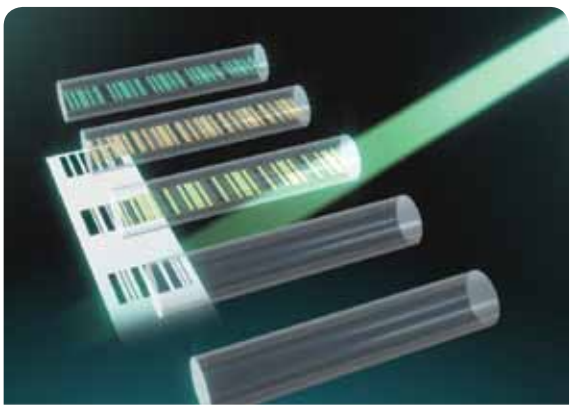
The BeadXpress Reader

Assays developed for the VeraCode beads are analyzed with Illumina's BeadXpress reader, a high-throughput, two-color laser detection system. This patented reader scans the beads for their code and fluorescence intensity signals (Figure 3). Perform data analysis using Illumina's BeadStudio data analysis software or other third-party data analysis programs.

Figure 1: The Illumina Beadxpress Reader

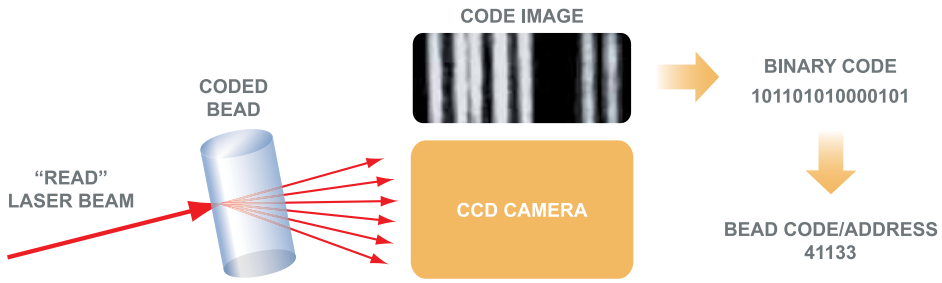
Figure captions should start with a takeaway point, or elaborate on the takeaway point that is in the title. For diagrams or charts, concisely explain what makes it relevant. Sometimes you also use this area to briefly describe what was done.

Figure 2: The Veracode Bead



Each Illumina VeraCode bead contains a code that allows identification of the bead type. This information is combined with the assay readout for downstream analysis.

Figure 3: The Veracode Bead Code Reading Process



The VeraCode digital code is formed using a holographic inscribing process. The holographic image in each bead diffracts an incident laser beam into multiple components. These components make up the optical signature of the bead code, which the BeadXpress reader analyzes and translates into a bead code to identify each assay being measured.

Veracode Solutions

The versatile VeraCode technology is the solution for numerous applications that benefit from a cost-effective, robust, high-throughput testing method. This innovative assay platform provides a key tool set for a broad range of powerful assays for biomarker research and validation, pharmaceutical development, industrial testing, agriculture, clinical research, and the development of molecular diagnostic assays.

A range of bead sets are currently available for assay development, supporting VeraCode as a versatile platform technology. For example, when combined with the Illumina GoldenGate Genotyping Assay, users can achieve genotyping multiplex levels of 96 and 384 assays within a single well of a standard microplate. Universal Capture Bead Sets allow researchers to develop customized multiplexed and high-throughput SNP genotyping assays. Carboxyl Bead Sets are available to give researchers a flexible method for designing multiplex assays for a variety of analytes, including proteins, peptides, nucleic acids, and other ligands.

BeadXpress enables researchers to access an entire range of bioassays with unprecedented multiplexing and throughput. Users are rewarded with a streamlined assay deployment that minimizes hands-on time and ensures consistent and reproducible results.

ADDITIONAL INFORMATION

To learn more about the VeraCode technology or about any of Illumina's products and services, contact us or visit us at www.illumina.com/veracode.

Illumina, Inc. • 9885 Towne Centre Drive, San Diego, CA 92121 USA • 1.800.809.4566 toll-free • 1.858.202.4566 tel • techsupport@illumina.com • illumina.com

FOR RESEARCH USE ONLY

© 2010 Illumina, Inc. All rights reserved.
Illumina, illumina*Dx*, Solexa, Making Sense Out of Life, Oligator, Sentrix, GoldenGate, GoldenGate Indexing, DASL, BeadArray, Array of Arrays, Infinium, BeadXpress, VeraCode, IntelliHyb, iSelect, CSPro, GenomeStudio, Genetic Energy, HiSeq, and HiScan are registered trademarks or trademarks of Illumina, Inc. All other brands and names contained herein are the property of their respective owners. Pub. No. 170-2006-001 Current as of 11 Jul 2007

illumina®

AGAATGATAACAGTAACACACTTCTGTTAACCTTAAGATTACTTGATCCACTGATTCAACGTACCGTAACGAACGTATCAATTGAGACTAAATATTAACGTACCATTAAGAGCTACCGTCTTCTGTTAACCTTAAGATTACTTGATCCACTGATTCAAC
TCAACGTACCGTAACGAACGTATCATTAAGATTACTTGATCCACTGATTCAACGTACCGTAACGAACGTATCAATTGAGACTAAATATTAACGTACCATTAAGAGCTACCGTGCAACGACGAAAAGAATGATAACAGTAACACACTTCTGTTAACCTT
CGACGAAAAGAATGATAACAGTAACACACTTCTGTTAACCTTAAGATTACTTGATCCACTGATTCAACGTACCGTAAAGATTACTTGATCCACTGATTCAACGTACCGTAACGAACGTATCAATTGAGACTAAATATTAACGTACCATTAAGAGCTACC
AACGTACCATTAAGAGCTACCGTGCAACAGTAACACACTTCTGTTAACCTTAAGATTACTTGATCCACTGATTCAACGTACCGTAACGAACGTATCAATTGAGACTAAATATTAACGTACCATTAAGAGCTACCGTGCAACGACGAAAAGAATGATAA
AGAATGATAACAGTAACACACTTCTGTTAACCTTAAGATTACTTGATCCACTGATTCAACGTACCGTAACGAACGTATCAATTGAGACTAAATATTAACGTACCATTAAGAGCTACCGTCTTCTGTTAACCTTAAGATTACTTGATCCACTGATTCAAC
GATTACTTGATCCACTGATTCAACGTTAAGATTACTTGATCCACTGATTCAACGTACCGTAACGAACGTATCAATTGAGCTTCTGTTAACCTTAAGATTACTTGATCCACTGATTCAACGTACCGTAACGAACGTATCAATTGAGACTAGCAACGAGC
CGTATCAATTGAGACTAAATATTAACGTACCATTAAGAGTCTGTTAACCTTAAGATTACTTGATCCACTGATTCAACGTACCGTAACGAACGTATCAATTGAGACTAAATATTAACGTACCATTAAGAGCTACCGTGCAACGAAAAGAATGATAACAGTA