Luminex

xMAP® Technology at a Glance

Overview

xMAP® microspheres (or beads) come in a variety of formats. MagPlex® Microspheres, for example, are 6.5 micron superparamagnetic beads that are dyed with up to three red and infrared fluorescent dyes, resulting in 500 distinctly colored bead sets and delivering data on up to 500 analytes per well.

Get Data on up to 500 Analytes per Well

Multiplexing biological assays reduces time to results, sample requirements, and costs compared to traditional methods. With an open architecture design, you can choose from an extensive menu of commercially available kits and design your own assays. The new Dual Reporter technology available on the xMAP INTELLIFLEX® DR-SE System further expands this capability: by exciting a second reporter dye per-analyte, xMAP INTELLIFLEX DR-SE can produce up to 1000 data points per well.

Microsphere Analysis

xMAP beads are internally color-coded microspheres with precise concentrations of multiple fluorescent dyes, yielding up to 500 distinctly colored bead sets.

xMAP microspheres can be coupled with target-specific molecules such as antigens, antibodies, oligonucleotides, enzyme substrates, receptors, etc. After an analyte in a sample is captured by this target-specific molecule, a fluorescent reporter molecule is introduced to complete the reaction on the surface of each microsphere.

The internal dyes on the microspheres are excited by the red laser or LED to identify the microsphere set.

Then, a green laser/LED excites the fluorescent reporter dye. On the xMAP INTELLIFLEX DR-SE System, a violet laser excites a second fluorescent reporter dye. Using these signals, each individual microsphere is identified and the amount of target molecule bound to its surface is quantified.

How it Works

Approximately 10^8 surface carboxyl groups (COOH) cover the surface of each bead and serve as covalent attachments for capture ligands. A fluorescent reporter is coupled to a target molecule, enabling detection following capture on the microsphere's surface.

xMAP Technology Overview

Nucleic Acid Assay

Serological Assay

Enzyme Assay

Immunoassay Capture Sandwich
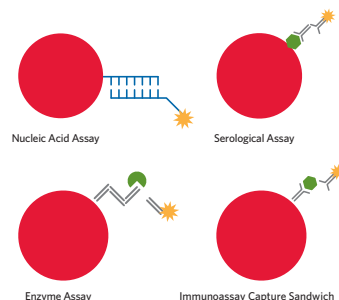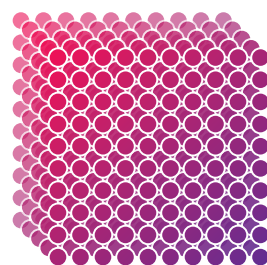
500 distinctly colored bead sets for up to 500 different analytes in one well.

xMAP® Technology can be used with a variety of assay chemistries.

Advantages of the xMAP® Technology Platform

High-Throughput Testing and Analysis – Because each microsphere serves as an individual test, a large number of different bioassays can be performed and analyzed simultaneously with limited sample.

Versatility – The same xMAP Technology can be used to perform assays using several different methods and chemistries, including nucleic acid hybridization, antigen-antibody binding, enzyme reactivity, receptor-ligand binding, and other protein interactions.
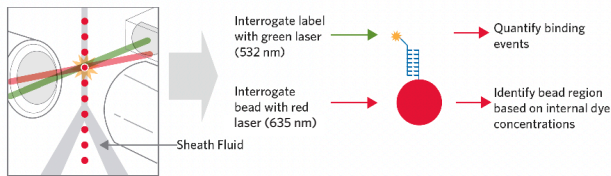
Accuracy – xMAP Technology generates real-time data and accurately quantifies the biological interactions being measured.

Flexibility – Multiplexing supports a variety of applications ranging from life sciences research and clinical diagnostics to food safety and biodefense.
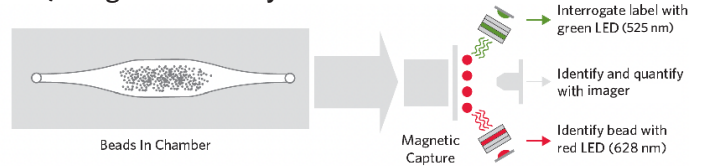
Reproducibility – High-volume production of xMAP microspheres within a single lot delivers reduced variability that solid-phased planar arrays cannot provide.

Trusted Technology – More than 28 years of innovation and 70,000+ publications from your scientific peers covering a wide variety of research areas.

Laser-Based Analysis

Interrogate label with green laser (532 nm) → Quantify binding events

Interrogate bead with red laser (635 nm) → Identify bead region based on internal dye concentrations

Sheath Fluid

LED/Image-Based Analysis

Beads In Chamber

Magnetic Capture

Interrogate label with green LED (525 nm)

Identify and quantify with imager

Identify bead with red LED (628 nm)

The microspheres pass through a red laser (or LED) which excites the internal dyes to distinguish the microsphere set. Then, a green laser (or LED) excites the fluorescent dye on the reporter molecule and determines the result of the assay.

Common Application Areas*

Drug Discovery/Genomics
- Single nucleotide polymorphisms (SNPs)
- Expression analysis with transcriptional profiling

Drug Discovery/Proteomics
- High-throughput drug compound screening
- Kinase selectivity screening of drug candidates against multiple common kinases
- Serological studies
- Multianalyte drug and drug metabolite profiling; toxicology and drug metabolism studies
- Drug target validation using receptor-ligand analysis

Diagnostics
- Genetically inherited disease screening, (e.g., cystic fibrosis)
- HLA typing for transplantation
- Autoimmune disease profiling
- Molecular pathogen detection

Common Assay Techniques
- Gene expression analysis
- Genotyping
- Protein expression analysis
- Animal-model serum analyte profiling
- Antibody epitope mapping
- Enzyme/substrate research
- Protein-protein interaction analysis

*Examples listed represent available in vitro diagnostic (IVD) test kits from Luminex or our partner companies. IVD kits are region specific and may not be approved for clinical use in some countries/regions. The xMAP INTELLIFLEX® platform is for research use only. Not for use in diagnostic procedures.

The FLEXMAP 3D®, Luminex® 200™, and xMAP INTELLIFLEX® are class 1 laser products.

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To learn more, please visit: www.luminexcorp.com/xMAP

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