Luminex: Integrating Genomics & Protein Assays

- Homebrew/Serology
- Cytokines
- PhosphoProteins
- Gene Expression
- GE modulation (microRNA)
- Transcription Factors

xMAP
Luminex’s xMAP Liquid Bead Array Technology

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Topics

> What is Luminex
> Benefits of using xMAP
> Applications
> Backwards compatibility, forward thinking
> Who is Luminex
What’s Life Science Research Using??

> Technology platform basics
  > Industry advances in multiplex and parallel analysis

> Test tubes  > Microwell plate  > Microarray  > xMAP® Technology: Microsphere-based liquid array
What is xMAP Technology?

> Combination of multiple proven technologies

> Color-coded 5.6 micron microspheres

> Assay occurs on bead surface

> Luminex LX200 Analyzer
Each Bead Type Is Assigned A Distinct Spectral Address

- Each bead maps to a specific region of the array based on the ratio of the two classification signals.

100 color codes = 100 bead regions = 100 simultaneous tests in each well.
How Does xMAP Technology Work?

Capture antibodies pre-coupled to unique bead set

Cell supernate added to pooled bead sets, multiple cytokines captured

Biotinylated antibodies bind to cytokines, detection via streptavidin-PE

**Microspheres as Molecular Carriers**

To perform a test, thousands of probes are bound to the microsphere.

**Capturing the Sample Molecule**

While suspended in a test sample, the bound probes collect molecules.

**Tagging the Reaction**

Fluorescently-labeled Reporter tags bind to the sample molecule.
xMAP Technology...Flow Cytometry Evolving

> Assays are read using a compact microsphere analyzer
> Analyzer samples well
> Lasers excite fluorescent dyes - red laser for bead classification and green laser for assay result
> Multiple readings for each microsphere set
> Software reports results in real-time
> Up to 9600 results read in 1 hour
xMAP Technology...Hardware

- Compact LX 200 Analyzer
- Reads 96-well plates, automated fluidics; wash, prime, shutdown
- Red laser for bead classification and green laser for analyte quantitation
- Software reports results in real-time
- Up to 9600 results read in 1 hour
xMAP vs. Traditional Methods

- Measurement of cytokines in extracellular fluids
  - ELISA

- Measurement of intracellular phosphoproteins
  - Western Blot
Better interaction btw assay & analytes

The Beads

- Microspheres are suspendable and easily multiplexed.
- Liquid-Phase Kinetics allows greater interaction and equilibrium with analytes and sample matrix.
- Greater accessibility for epitope binding.
- “Beads find their correct target”
Benefits of Using xMAP™ Technology - EFFICIENCY

> Multiplex
  > Decrease sample volume requirements
  > Reduce assay reagent volume, expense & labor
  > Generate more information on interrelationships between analytes within a single sample

> Bead-based array
  > More favorable liquid phase hybridization kinetics

> Suitable for life science research and diagnostics
  > Potential to translate LS research to clinical diagnostic
Benefits of Using xMAP™ Technology - SCALABILITY

- Each bead maps to a specific region of the array based on the ratio of the two classification signals.

Many analytes few samples...Focused analytes many samples.
Benefits of Using xMAP™ Technology - FLEXIBILITY

Applications

- Immunoassay
- Nucleic Acid Assay
- Enzyme Assay
- Receptor-Ligand
microRNA: Bead-based hybridization vs. Planar array

Method 2

Method 1

Luminex Assay Menus

> FDA-cleared/IVD Clinical assays
  > More than 4 dozen diagnostic assays

> Growing list of Research assays
  > Proteins
  > Gene Expression
  > microRNA
  > Transcription Factors
  > Specialty Panels
xMAP® Microspheres...Kits or Homebrew

Beads:
- Carboxy
- SeroMAP
- LumAvidin
- FlexMAP
- MagPlex
Who is Luminex...

- Founded 1995
- First Patent 1996
- First Instrument 1999
- IPO (LMNX) 2000
- 50 Partners 2005
- Over 500 analytes 2005
- FDA cleared kits 2005
- 27 Patents issued 2005
- 52 patents pending 2005
- 5000 Placements 2008
- FlexmiR microRNA 2008
- xPONENT 2008
- RVP Panel 2008
- FlexMAP3D 2008
- Genomic Assays 2008
“Multi-Partner” model allows rapid development of the broadest assay menu

- We license xMAP technology to many kit developers
- These partners provide “market flexibility” and multiple choices of vendors for end-users
- Customers can also choose to develop custom-coupled assays with help from these partners or Luminex directly
Luminex in the Future...

> New Hardware: FlexMAP3D
  > 96 & 384-well
  > Magnetic Beads
  > Faster & Higher Thruput
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