

Suspension Arrays



Bio-Plex® Suspension Array System



The Leader in Multiplex Analysis



The Bio-Plex Suspension Array System

The Bio-Plex system is a flexible, easy-to-use microplate-based bioassay system. The Bio-Plex system enables you to quantitate up to 100 different analytes in a single sample, giving you the power to understand complex relationships among proteins in normal and disease states. Multiplex analysis with the Bio-Plex system provides more information with less sample. The Bio-Plex system comprises all products for a complete workflow — from sample prep reagents and diluents to sophisticated data analysis — for unsurpassed sensitivity, precision, and accuracy.

With the Bio-Plex system, you can multiplex:

- Immunoassays
- Enzyme assays
- Receptor-ligand assays
- Nucleic acid hybridization assays

Cell Signaling ▪ Immune Response ▪ Metabolism ▪ Signal Transduction ▪ Cancer Research



The Power of Bio-Plex Assays

Bio-Plex multiplex assays deliver more data in less time, with less sample, and with fewer manual manipulations. The examples below show a comparison between a Bio-Plex assay and another method. On the left, a Bio-Plex phosphoprotein 5-plex assay is compared with 5 western blots. On the right, a Bio-Plex human cytokine 27-plex assay is compared with 27 ELISA assays.

Analysis of 5 Phosphoproteins in 12 Samples

	Western Blot	Bio-Plex
Number of phosphoproteins	5	5
Number of samples	12	12
Total data points	60	60
Number of gels or 96-well plates	5	1
Data points per gel or plate	12	60
Total time required	~8 hr + one overnight incubation	3 hr + one overnight incubation
Sample volume	125 µl	25 µl
Dynamic range	Limited total protein	50–900 µg/ml

Analysis of 27 Cytokines in 80 Samples

	ELISA	Bio-Plex
Number of cytokines	27	27
Number of samples	80	80
Total data points	2,160	2,160
Number of 96-well plates	27	1
Data points per plate	80	2,160
Total time required	>60 hr	3 hr
Sample volume	Serum or plasma, >1 ml* Cell culture supernatant, >1 ml*	Serum or plasma, 12.5 µl Cell culture supernatant, 50 µl
Assay range	Serum or plasma, 2–3,000 pg/ml Cell culture supernatant, 2–3,000 pg/ml	Serum or plasma, 0.2–3,200 pg/ml Cell culture supernatant, 2.0–32,000 pg/ml

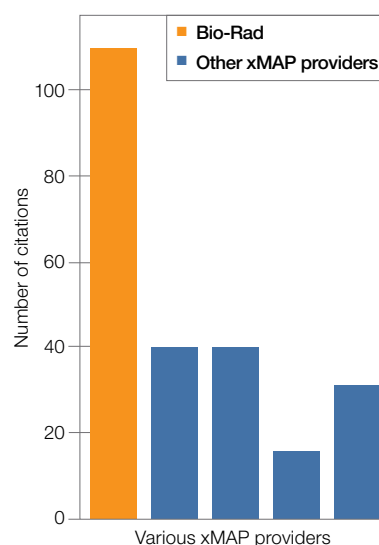
* Based on 50 µl/well of sample.

Vaccine Development ■ Drug Development ■ Biomarker Discovery ■ Clinical Research

Proven Results

The Bio-Plex system is the most widely cited multiplex assay platform used for research in many areas, including Alzheimer's and Parkinson's diseases, diabetes, obesity, cancer, asthma, cystic fibrosis, autoimmune disease, viral infections, and vaccine development.

For up-to-date reference lists for cytokine and phosphoprotein assays, refer to bulletins 5297 and 5394, respectively, on the enclosed CD or at www.bio-rad.com



xMAP cytokine assay citations published by 2005.

A Multitude of Choices

Bio-Rad offers a continually growing line of assays and associated products for extracellular and intracellular analysis. Over 130 multiplex targets are now available.

For the most up-to-date target information, go to

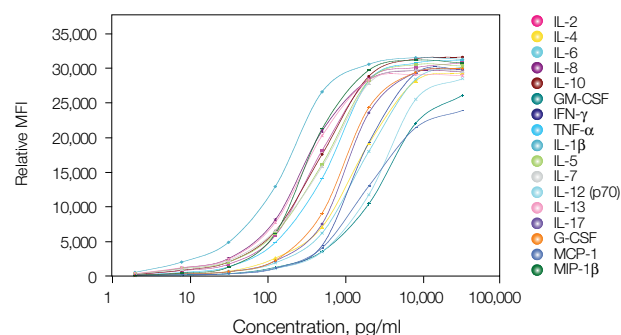
www.bio-rad.com/bio-plex/

Cytokine, Chemokine, and Growth Factor Assays

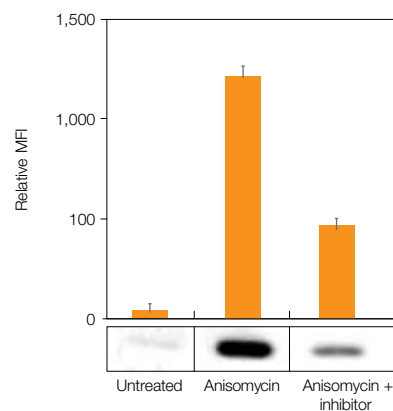
- Multiplex assays for human, mouse, and rat cytokines
- Diverse matrices, including serum, plasma, and cell culture supernatants
- Dynamic range across 4 orders of magnitude (~0–32,000 pg/ml)
- Premixed beads and premixed detection antibodies
- Premixed standards for multiplex standard curves

Phosphoprotein and Total Target Assays

- Multiplex assays for specific phosphorylation states and expression levels of multiple proteins
- Sample volume as little as 25 μ l of cell-culture or tissue lysate
- Highly specific antibodies exclusively developed and validated by Cell Signaling Technology, Inc.
- Higher-specificity sandwich-format assays that minimize cross-reaction with other cellular proteins
- Common buffers for all assays



Bio-Plex 17-plex human cytokine assay panel. Premixed standards are included with each cytokine assay panel. MFI, median fluorescence intensity.



Bio-Plex phospho-p38 MAPK assay analysis. Activation of p38 MAPK was attenuated in NIH 3T3 cells treated with a p38 MAPK inhibitor. Upper panel, Bio-Plex assay; lower panel, western blot. MFI, median fluorescence intensity.

From Multiplex Assay to Results in As Little As 3 Hours

Bio-Plex assays are designed using microscopic beads, each with a different color code (spectral address) to permit discrimination of individual assays. Beads are dyed with different ratios of two fluorophores and are thus classified into 100 unique bead regions (xMAP technology).

1 Coupled Beads

A Bio-Plex assay uses a selection of beads with different spectral addresses, each coupled to antibodies against a different target.

- Add coupled beads to wells of a 96-well plate
- Wash

2 Samples

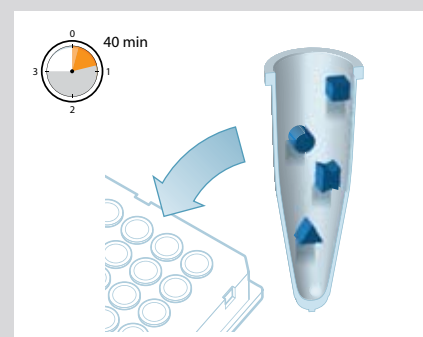
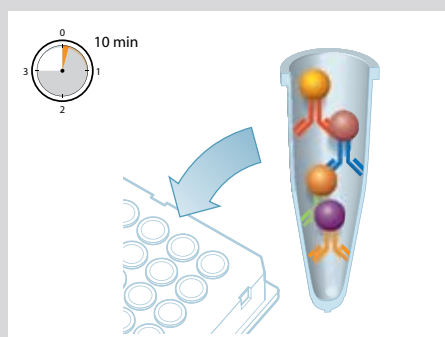
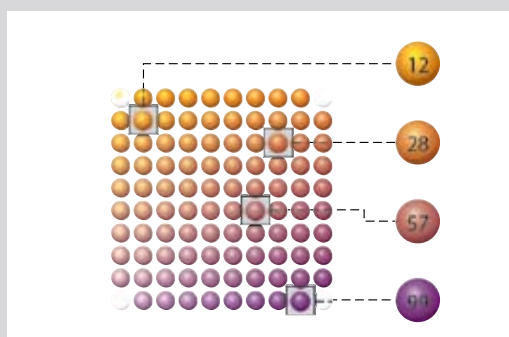
Serum, plasma, or cell lysates (prepared with a Bio-Plex cell lysis kit) can be used with Bio-Plex assays.

- Add samples to wells containing coupled beads
- Incubate 30 min
- Wash

3 Detection

Biotinylated antibodies are used to detect each target.

- Add streptavidin-APC
- Incubate 30 min
- Wash



Bio-Plex Pro™ Isotyping Assays

The Bio-Plex Pro isotyping assays allow multiplex analysis of immunoglobulins in only 10 µl of sample. The Bio-Plex Pro family of assays offers excellent sensitivity using either a magnetic washing system or standard vacuum manifold.

- Immune response to infection, disease, vaccination, or drug therapy profiled in a single experiment
- 7 immunoglobulins (IgG₁, IgG₂, IgG₃, IgG₄, IgM, IgA, and IgE) tested in a single well
- Magnetic beads enable automation

High-Sensitivity Cytokine Assays

The Bio-Plex® Precision Pro™ human cytokine assay panel contains highly sensitive, highly reproducible magnetic bead-based assays.

- Assay protocol is similar to Bio-Plex cytokine assays
- Optimized for serum and plasma samples
- Detects IL-1β, IL-2, IL-4, IL-5, IL-6, IL-10, IL-12 (p70), IL-13, IFN-γ, and TNF-α
- Contains controls for generating QC samples
- All-in-one kit format includes assay, reagent, and diluent components in a single box

Multiplex Nucleic Acid Solutions

Bio-Rad offers the complete solution for bead-based multiplex nucleic acid analysis. Using the Bio-Plex system, you can easily multiplex up to 100 targets in one well and develop cost-effective applications in SNP analysis, pathogen detection, strain typing, haplotyping, and gene expression.

SNP genotyping is simplified with Bio-Plex® SNP Manager™ genotyping macro, specifically designed for integrated allelic discrimination using Bio-Plex Manager software. Download SNP Manager from www.bio-rad.com/bio-plex/

x-Plex™ Premixed Assay Mixing Service

If the particular combination of cytokine or phosphoprotein targets needed for your research is not available in a Bio-Plex preconfigured assay panel, order what you need with custom-mixed x-Plex assays. You select the specific targets to test, and we mix the multiplex assay panel to order. Go to www.bio-rad.com/bio-plex/x-plex/ to select your preferred combination of targets. x-Plex assays include:

- Premixed conjugated beads
- Premixed detection antibodies
- Premixed standards (cytokines) or controls (phosphoproteins)

Order buffer, cell lysis, and diluent kits to complete your package.



x-Plex premixed assays can be ordered online.

Develop Your Own Assay

Develop unique bead-based multiplex assays with Bio-Plex COOH beads. Bio-Plex COOH beads are carboxy-coated beads ready to be covalently coupled to the protein or nucleic acid of your choice.

- Couple antibodies, antigens, receptors, ligands, enzymes, or nucleic acids
- Couple protein (~6–150 kD) with 1 ml of beads in <5 hr for use in up to 20 microplates

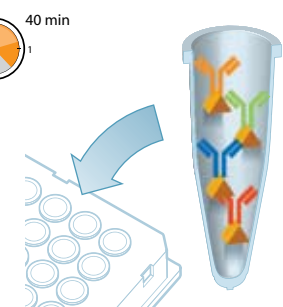
Detection Antibodies

Biotin-labeled detection antibodies specific for secondary epitopes on target.

Add detection antibodies to wells

Incubate 30 min

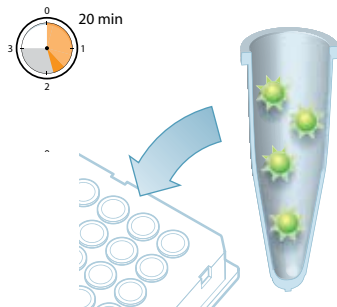
Wash



4 Reporter

Fluorescently labeled streptavidin reporter binds to the biotin-labeled detection antibodies.

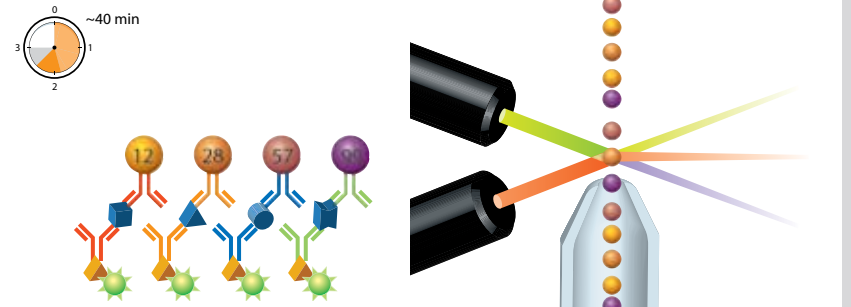
- Add reporter to wells
- Incubate 10 min
- Rinse
- Resuspend in assay buffer



5 Assay

In the Bio-Plex array reader, a red classification laser and a green reporter laser illuminate individual beads to identify each bead's spectral address and associated reporter signal.

- Dyed beads are identified by their internal fluorescent signature (bead region)
- Level of target bound to beads is indicated by intensity of reporter signal
- Multiplex data are reported simultaneously



Professional Analysis and User-Friendly Instrument Control

Bio-Plex Manager™ Software

The Bio-Plex suspension array system is the only bead-based multiplex assay system that provides system control, system validation, calibration, data acquisition, and data analysis in a single software application.

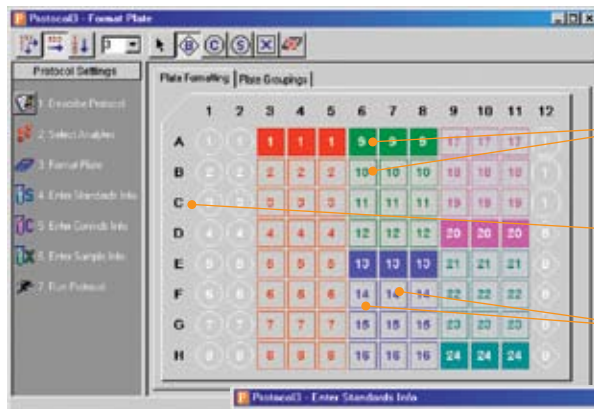
Unique features include:

- User-friendly interface designed around the assay workflow
- Automated functions for startup, calibration, validation, and shutdown
- Sophisticated data analysis tools
- Automatic, real-time error detection and reporting
- XML and Microsoft Excel export function

For more information, refer to bulletin 2880.

Bio-Plex Manager 4.1 Security Edition – for 21 CFR Part 11 Compliance

In addition to all the features of Bio-Plex Manager 4.1 Standard Edition software, Bio-Plex Manager Security Edition software works with the built-in security features of Microsoft Windows 2000 and Windows XP Professional operating systems to provide tools and reports that allow you to comply with U.S. FDA 21 CFR Part 11 regulations.

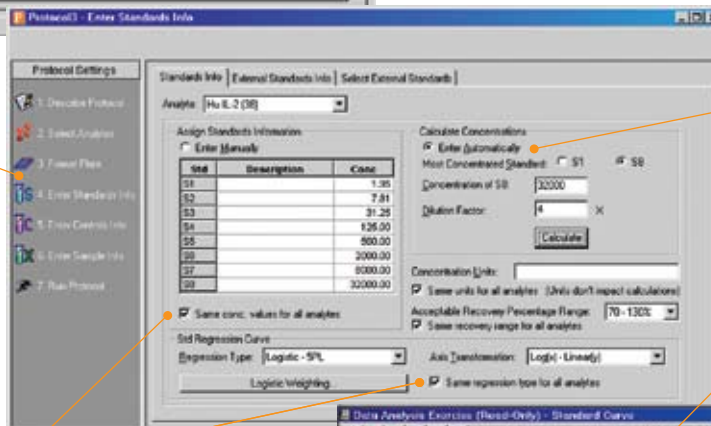


Calculate percent change in qualitative assays for grouped samples (same color) vs. a designated reference (solid color)

Add standards for quantitative assays to each plate (circles), or increase sample throughput by importing external standards from another assay plate

Automatically calculate mean, %CV, standard deviation, and standard error for replicate samples

Set up experiments easily

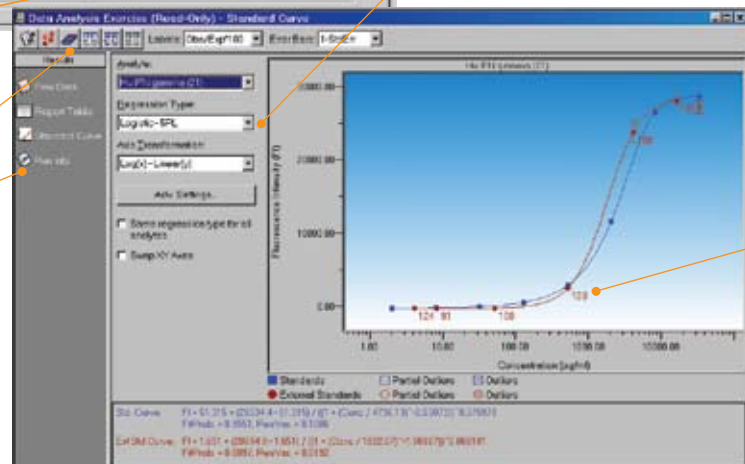


Automatically calculate the concentration of serially diluted standards

Fit curves with Brendan StatLIA 5PL module

Enter standard curve values and fit the curves to individual analytes or across all analytes in one simple step

Easily access results and protocol; see bulletin 2880 for more information



Automatically calculate % recovery values

Bio-Plex 200 System — Fully Integrated for Optimal Results

Integrated Solutions

The Bio-Plex 200 system is designed, manufactured, and tested as a complete, integrated system combining xMAP suspension array technology with reliable hardware, dedicated software, and system validation and calibration tools. The fully integrated and validated system ensures accurate and reproducible assay results, plus a single source for all the support you need to maintain your productivity.

- Standardized single-source system components for error-free operation
- Worldwide technical support and on-site field service
- Service agreements for scheduled preventive maintenance

Tools for Optimal Assay Performance

Reliable and reproducible multiplex assays require an instrument with proper optical alignment, reporter performance, and fluidics integrity. Performing system validation and reader calibration is the best way to ensure the precision of your assay results and to confidently make comparisons between data sets. The Bio-Plex system offers unique validation tools.

- Automated installation and operational qualification (IQ/OQ)
- Validation kit for IQ/OQ and monthly validation of primary performance parameters, with integrated logs for record keeping
- Calibration capabilities for both broad range and low range standard detection (for more information, refer to bulletin 2900)

Open Platform

The Bio-Plex system can be used with any xMAP assay, including Bio-Plex assays that you develop and those provided by other Luminex partners. Bio-Plex Manager software supports all Luminex 100 and 200 instruments and both magnetic and polystyrene beads. Kits are available to run Bio-Plex Manager on Luminex assay readers. For more information, contact your local Bio-Rad sales representative.

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MCV plate



Bio-Plex validation kit



Bio-Plex calibration kit

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