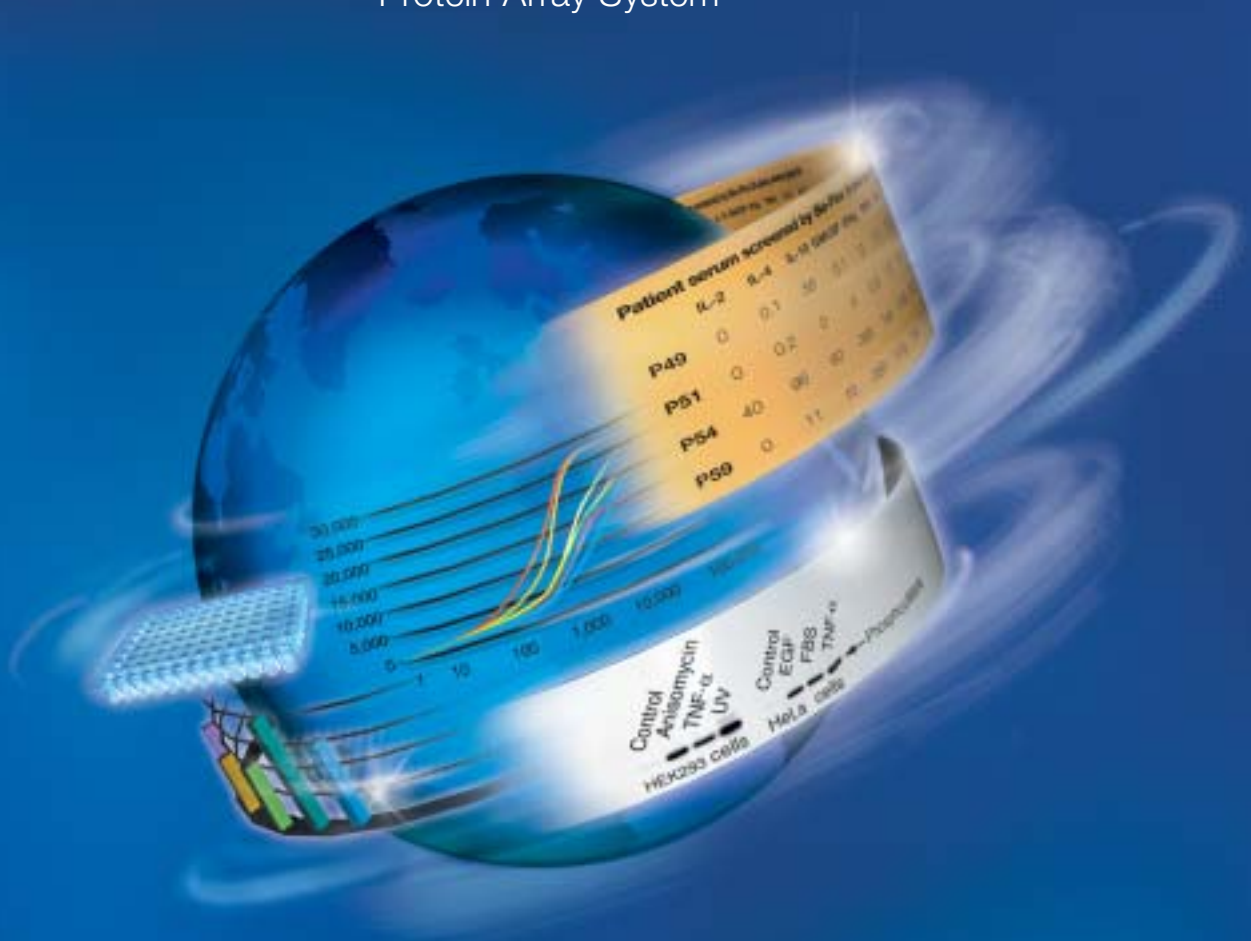


The Bio-Plex™  
Protein Array System



*A world of information...*

**BIO-RAD**



*from a single drop.*

# The **Bio-Plex** Protein Array System

## Get a Global View of Signal Transduction Pathways

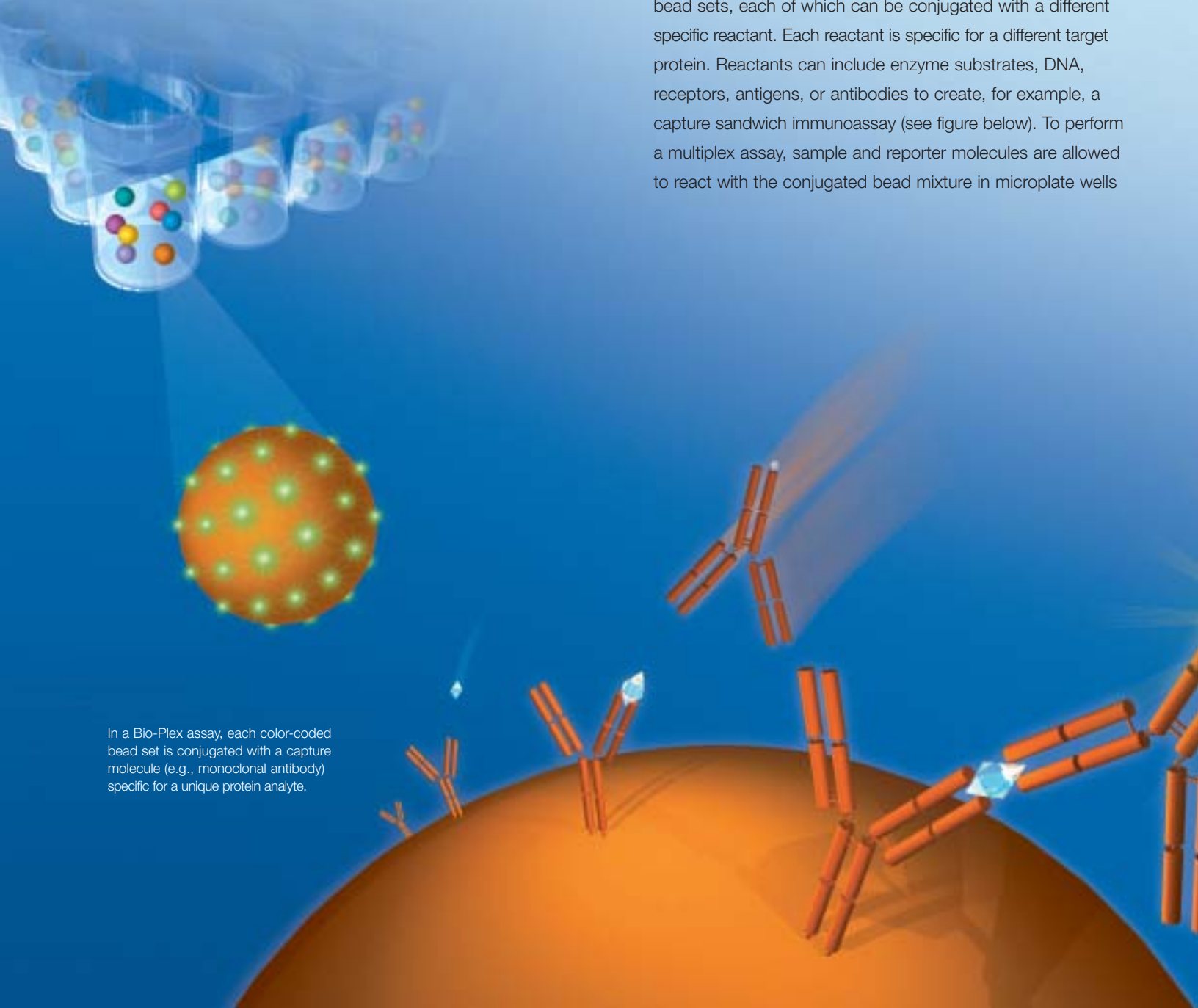
The Bio-Plex protein array system is a flexible, easy-to-use protein analysis system that permits simultaneous quantitative analysis of up to 100 different proteins and peptides in a single microplate well. By multiplexing with the Bio-Plex system, you can dramatically increase the amount of useful information from rare or volume-limited samples such as mouse and rat serum, and decipher complex interrelationships between proteins involved in signal transduction pathways.

## Powerful Drug Discovery Tool

The Bio-Plex protein array system helps reveal a more complete view of the effects of candidate drugs on the biology of cells, research animals, and human subjects, and addresses your drug discovery and development needs by integrating hardware, powerful data reduction software, validation tools, and assays into a single platform.

## Flexible Protein Array System

The Bio-Plex protein array system uses up to 100 color-coded bead sets, each of which can be conjugated with a different specific reactant. Each reactant is specific for a different target protein. Reactants can include enzyme substrates, DNA, receptors, antigens, or antibodies to create, for example, a capture sandwich immunoassay (see figure below). To perform a multiplex assay, sample and reporter molecules are allowed to react with the conjugated bead mixture in microplate wells

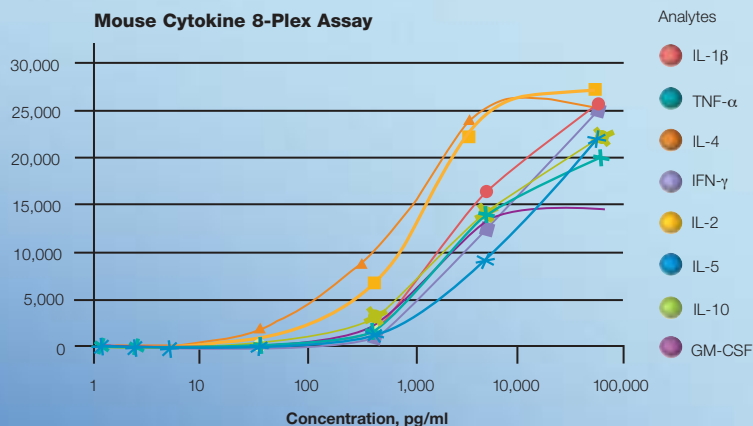


In a Bio-Plex assay, each color-coded bead set is conjugated with a capture molecule (e.g., monoclonal antibody) specific for a unique protein analyte.

The flow-based Bio-Plex system identifies each specific reaction based on bead color, and quantitates it. The magnitude of the reaction is measured using fluorescently labeled reporter molecules also specific for each target protein. Bio-Plex Manager™ software automates data analysis and generation of detailed summary reports. With the Bio-Plex system you can:

- Simultaneously quantitate up to 100 protein analytes from culture media, sera, and other matrices
- Instantly customize your assays by mixing bead sets
- Automatically analyze up to 96 samples in under 35 min
- Dramatically increase the amount of useful data

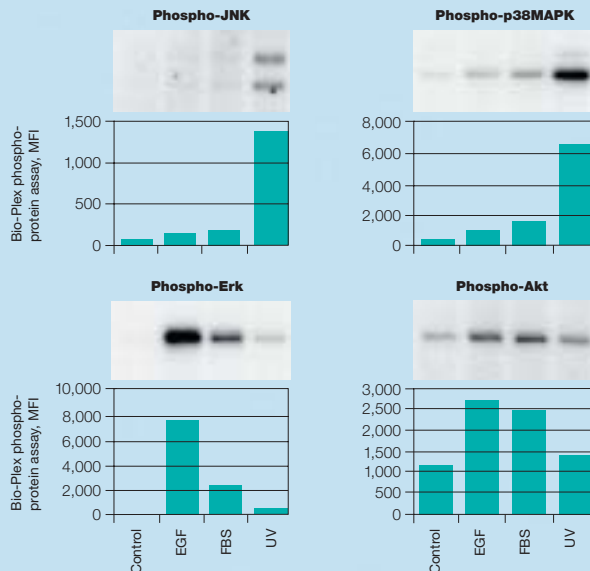
#### Mouse Cytokine 8-Plex Assay



Standard curve from the simultaneous analysis of 8 cytokines from mouse serum.

Each captured analyte is detected using a highly specific reporter molecule coupled with a fluorescent label.

#### Multiplex Phosphoprotein Assay



Lysates of HEK293 cells, treated with epidermal growth factor (EGF), fetal bovine serum (FBS), UV light, or left untreated (control), were subjected to either immunoblot analysis with antibodies specific for the phosphorylated forms, or to a multiplex (4-plex) Bio-Plex phosphoprotein assay to determine phosphorylation levels of the proteins indicated. Note that signals generated by Bio-Plex phosphoprotein assay correlate well with those generated by immunoblot analysis.

#### Optimal Assay Performance

Through the meticulous selection and qualification of immunoassay reagents, the bead-based Bio-Plex assays overcome the limitations of traditional ELISA and western blot-based analyses. Features of the Bio-Plex assay include:

- Increased throughput and reduced hands-on time compared to “single-plex” immunoassays and immunoblot analyses
- Greater dynamic range and recovery versus ELISA, to produce more reproducible and accurate results
- Greater reproducibility versus ELISA
- Specificity and cross-reactivity of Bio-Plex premixed assays are carefully checked

#### Broad Selection of Analytes

- Single and multi-analyte cytokine assays
  - Single and multi-analyte phosphoprotein assays
  - Protein coupling kit for custom assay development
- 96-well Bio-Plex assays can be combined to create personalized multiplex arrays.

Visit [www.bio-rad.com/bioplexsystem/x-plex/](http://www.bio-rad.com/bioplexsystem/x-plex/) for details and ordering information.

## Bio-Plex Manager Software

### An Easy-to-Use, Flexible Tool

A number of features have been designed into the Bio-Plex Manager software package to make multiplex protein analysis as easy as reading a 96-well microplate. These include:

- Quick guide that quickly leads you through system setup and data analysis with minimal reference to a manual
- Automated setup, run, and shutdown functions
- Simple and flexible multiplex template formatting
- Automated system monitoring and error flags

### The First Data Analysis Software for Multiplex Assays

To allow changes and correlations between analytes to be used to maximum effect, intuitive software is necessary for the efficient handling of the large amount of data generated in multiplex assays. Bio-Rad has applied years of microplate system development experience to create Bio-Plex Manager, the first software package of its kind dedicated to the analysis of multiplex assay data. Bio-Plex Manager features:

- Multiplex 5-parameter curve fitting analyses
- Automated calculation of concentration and coefficient of variation
- Real-time display of data acquisition, including beadmap histogram, flow rate, and median fluorescence intensity values for all analytes
- Standard exportable data file format (.xls)

**Cytokine Content (pg/ml) in Patient Serum Screened by Bio-Plex Assay**

	IL-2	IL-4	IL-10	GM-CSF	IFN- $\gamma$	TNF- $\alpha$	IL-6	IL-8
P45	50	111	70	300	822	1,200	1,815	58
P49	0	0.1	58	0.1	0	0.1	0.5	0
P51	0	0.2	0	0	0.5	0.1	0.5	0
P54	40	96	60	285	741	1,100	1,798	47
P59	0	11	10	250	170	734	15	0
P61	0	7.2	8	250	144	668	3.5	0
P67	0.1	1.5	10	11	12	10	4	0
P71	0.5	77	11	150	963	1,257	337	1.5
P74	0.5	40	8	150	928	1,215	339	1.5
P75	0.5	72	5	145	926	1,077	355	1

Bio-Plex assays provide valuable insight into the efficacy and toxicity of drug candidates. Shown is the multiplex analysis of 8 human cytokines from the sera of 10 patients undergoing drug therapy.



The Bio-Plex protein array system includes a 96-well microplate reader, Bio-Plex Manager software, calibration and validation reagents, and assays for the rapid simultaneous analysis of protein analytes.

## The Complete Protein Array System

### Integrated System Ensures Optimal Results

The Bio-Plex protein array system is a unique and complete system that includes a 96-well fluorescent microplate reader, Bio-Plex Manager software, calibration and validation kits, and assay reagents designed, manufactured, and tested as a fully integrated system to ensure accurate and reproducible assay results. With an integrated, validated bioassay system you can:

- Remove error associated with deviations between nonstandard system components and assays
- Obtain optimal immunoassay performance and reproducible results
- Quickly determine whether irregular assay results are due to hardware, software, or assay artifacts
- Simplify regulatory submissions and installation and operational qualification (IQ/OQ) certification

### Single-Source Service and Support

The integrated design of the Bio-Plex system means that a single source provides the support you need to maintain your productivity. Technical support and on-site field service are available worldwide, and a variety of Bio-Rad Service Agreements offering scheduled preventive maintenance are available to ensure continuous system uptime.

### Custom Protein Array Formulation

Bio-Rad offers a custom protein array development service for the proprietary development and manufacture of multiplex assays designed to your specifications. Options include the custom formatting of Bio-Plex assays, the development of novel multiplex assays, or a combination of the two.

Contact your local Bio-Rad representative to schedule a detailed discussion of the Bio-Plex protein array system and Bio-Plex assay development services. You can also visit us on the Web at [www.bio-rad.com/bioplexsystem/](http://www.bio-rad.com/bioplexsystem/).

The Bio-Plex protein array system includes fluorescently labeled microsphere beads and instrumentation licensed to Bio-Rad Laboratories by the Luminex Corporation.

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