

Acute Phase Response
Cancer
Cardiovascular Disease
Cytokines, Chemokines,
Growth Factors
Diabetes
Gene Expression
Genotyping
Immunoglobulin Isotyping
MicroRNA
Signal Transduction
Toxicology

Bio-Plex Pro™ Rat Cytokine Assays

MAGNETIC SEPARATION ENABLED

EPO, G-CSF, GM-CSF, GRO/KC, IFN- γ , IL-1 α , IL-1 β , IL-2, IL-4, IL-5, IL-6, IL-7, IL-10, IL-12(p40), IL-12(p70), IL-13, IL-17, IL-18, M-CSF, MIP-1 α , MIP-2, MIP-3 α , RANTES, TNF- α , VEGF

- Validated on rat plasma and serum samples
- Magnetic or vacuum assay separation
- All-in-one kit format
- Flexible ordering options



More Cytokine Choices, Improved Sensitivity

Bio-Plex Pro rat cytokine assays are magnetic bead-based multiplex assays that offer accurate and reproducible measurements of 25 rat cytokines. They are available in premixed 23-plex and Th1/Th2 12-plex panels, 25 singleplex sets, and literally millions of customizable configurations using the Bio-Plex® Assay Builder. These assays have been developed to provide reliable performance with the flexibility required to meet all of your research needs.

- Improved sensitivity over the previous 9-plex rat cytokine assay
- Flexible ordering options — order either a premixed panel, singleplex analytes of interest, or customize your assay with the Bio-Plex Assay Builder (www.bio-rad.com/assaybuilder)
- Compatible with Bio-Plex 200, Bio-Plex 3D, and MAGPIX systems

Benefits of Magnetic Bead-Based Assays

Magnetic bead-based assays allow optional magnetic separation during wash steps using an automated magnetic bead washer. This innovation greatly simplifies assay processing, eliminating the need for a vacuum manifold. Many users also see significantly improved reproducibility.

Assay Validation

All Bio-Plex Pro assays are put through a rigorous evaluation that includes these assay parameters:

- Specificity and cross-reactivity testing
- Accuracy evaluation in key sample matrices
- Inter- and intra-assay precision
- Sensitivity (LOD)
- Assay range evaluation (LLOQ/ULOQ)
- Linearity of dilution
- Parallelism and matrix effect validation
- Sample analysis ensuring normal and disease samples fall within the assay range

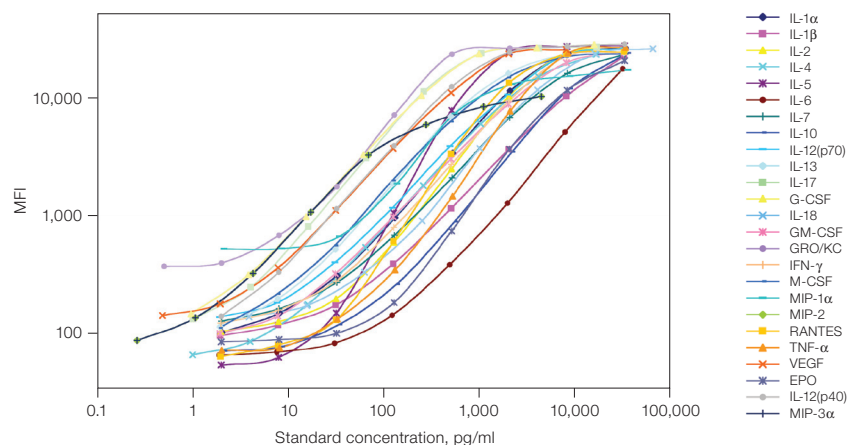


Fig. 1. Standard curves for Bio-Plex Pro rat cytokines.

BIO-RAD

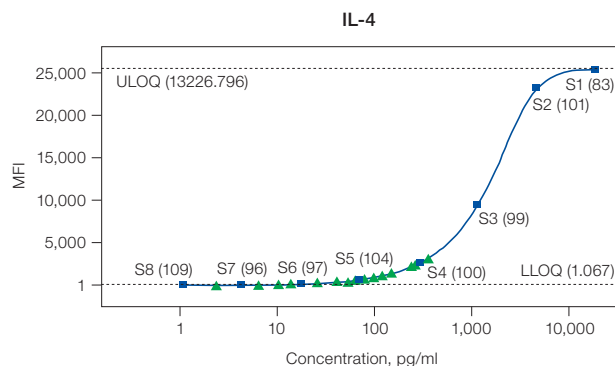


Fig. 2. Normal and diabetic rat serum and plasma IL-4 levels fall within the broad dynamic range.

Assay Range

Designed for optimal assay working ranges, each analyte is tested to ensure both normal and diseased samples detected from both serum and plasma are within quantitation limits. Figure 2 shows IL-4 as detected in normal and diabetic rat serum and plasma. All samples and sample types fall within the upper and lower levels of quantitation (1.067 pg/ml to 13,226.796 pg/ml). These limits are calculated and displayed using Bio-Plex Manager™ software 6.0.

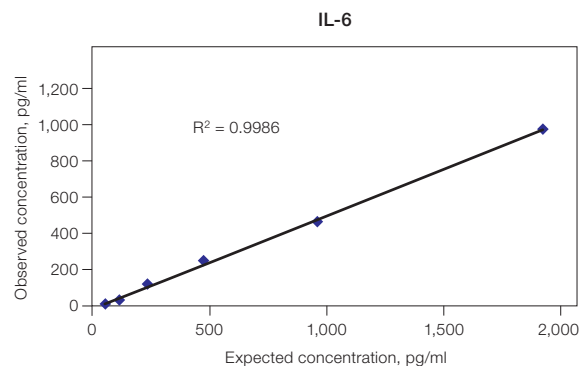


Fig. 3. Linearity of dilution for IL-6 in plasma. Within the assay working range, $R^2=0.9986$.

Linearity

Linearity of dilutions ensures that analytes present in concentrations above the LLOQ can be diluted and measured accurately within the assay working range. Analyte dilution measurements in serum, plasma, standard diluent, and RPMI (3-fold dilution series) were examined using linear regression analysis. Representative results are shown in Figure 3 for IL-6 in plasma.

Table 1. The LLOQ, ULOQ, LOD, and inter-assay precision %CV are mean data determined from three independent multiplex assays in a serum-based matrix. Intra-assay %CV is derived from one representative assay. LLOQ and ULOQ are defined as the boundary standard curve points in which the performance specifications of individual standard points were met for 10% intra-assay CV, 15% inter-assay CV, and a recovery range of 80–120%. Data were generated using the magnetic workflow with the Bio-Plex Pro II wash station.

Targets	Assay Working Range, pg/ml		Assay Sensitivity, pg/ml	Assay Precision	
	LLOQ	ULOQ	LOD	Intra-assay %CV	Inter-assay %CV
Singleplex Assays					
IL-12(p40)	2	2,015	0.4	3	4
MIP-2	0.3	1,085	0.2	4	5
23-Plex Assays					
EPO	32	32,258	8	4	1
G-CSF	1	2,911	0.2	2	1
GM-CSF	6	31,519	0.6	4	1
GRO/KC	2	1,521	0.6	4	2
IFN- γ	4	23,955	1	5	3
IL-1 α	2	24,649	1	3	3
IL-1 β	6	31,666	2	4	2
IL-2	8	7,981	3	4	3
IL-4	1	16,209	1	6	3
IL-5	6	2,007	6	4	0.4
IL-6	13	30,766	10	4	3
IL-7	2	32,472	0.4	4	3
IL-10	4	34,385	5	4	6
IL-12(p70)	4	15,481	0.7	4	3
IL-13	2	15,751	0.9	4	2
IL-17	1	3,079	0.1	3	2
IL-18	4	31,652	4	4	5
M-CSF	2	23,264	0.4	2	3
MIP-1 α	25	4,325	12	4	7
MIP-3 α	1	3,032	0.7	4	2
RANTES	8	7,950	3	5	2
TNF- α	16	8,207	3	5	7
VEGF	0	3,963	0.3	3	5

Assay Performance Definitions

Assay working range — the range of concentrations within which the assay is precise and accurate.

Boundaries of the assay working range are defined by the lower limit of quantitation (LLOQ) and the upper limit of quantitation (ULOQ)

Precision — the coefficient of variation (%CV) at concentrations within the assay working range

Accuracy — ratio of the observed concentration versus the expected concentration of a known amount of spiked analyte within the assay working range

Sensitivity (limit of detection, LOD) — the concentration of analyte for which the fluorescence intensity signal is two standard deviations above the background signal

Rat Cytokine Group I	23-Plex Panel (171-K1001M)	12-Plex Panel (171-K1002M)	Singleplex/x-Plex Bead Regions
EPO	•		14
G-CSF	•		54
GM-CSF	•	•	37
GRO/KC	•		57
IFN- γ	•	•	34
IL-1 α	•	•	21
IL-1 β	•	•	28
IL-2	•	•	22
IL-4	•	•	33
IL-5	•	•	52
IL-6	•	•	56
IL-7	•		38
IL-10	•	•	19
IL-12p40			76
IL-12p70	•	•	78
IL-13	•	•	15
IL-17	•		72
IL-18	•		20
M-CSF	•		26
MIP-1 α	•		77
MIP-2			27
MIP-3 α	•		36
RANTES	•		55
TNF- α	•	•	43
VEGF	•		47

Ordering Information

Catalog # Description

Bio-Plex Pro Rat Cytokine Multiplex Kits

171-K1001M	Bio-Plex Pro Rat Cytokine 23-Plex Panel , 1 x 96-well, includes premixed coupled magnetic beads and detection antibodies, standard, assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, filter plate, flat-bottom plate, sealing tape, standard diluent, sample diluent, and instructions for the detection of 23 cytokines from rat serum or plasma
171-K1002M	Bio-Plex Pro Rat Cytokine Th1/Th2 12-Plex Panel , 1 x 96-well, includes premixed coupled magnetic beads and detection antibodies, standard, assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, filter plate, flat-bottom plate, sealing tape, standard diluent, sample diluent, and instructions for the detection of 12 cytokines from rat serum or plasma

Bio-Plex Pro Rat Cytokine Singleplex Sets*

171-L1002M	Bio-Plex Pro Rat Cytokine EPO Set , 1 x 96-well, includes coupled magnetic beads and detection antibodies for detecting rat EPO
171-L1003M	Bio-Plex Pro Rat Cytokine G-CSF Set , 1 x 96-well, includes coupled magnetic beads and detection antibodies for detecting rat G-CSF
171-L1004M	Bio-Plex Pro Rat Cytokine GM-CSF Set , 1 x 96-well, includes coupled magnetic beads and detection antibodies for detecting rat GM-CSF
171-L1005M	Bio-Plex Pro Rat Cytokine GRO/KC Set , 1 x 96-well, includes coupled magnetic beads and detection antibodies for detecting rat GRO/KC
171-L1006M	Bio-Plex Pro Rat Cytokine IFN-γ Set , 1 x 96-well, includes coupled magnetic beads and detection antibodies for detecting rat IFN- γ
171-L1007M	Bio-Plex Pro Rat Cytokine IL-1α Set , 1 x 96-well, includes coupled magnetic beads and detection antibodies for detecting rat IL-1 α
171-L1008M	Bio-Plex Pro Rat Cytokine IL-1β Set , 1 x 96-well, includes coupled magnetic beads and detection antibodies for detecting rat IL-1 β
171-L1009M	Bio-Plex Pro Rat Cytokine IL-2 Set , 1 x 96-well, includes coupled magnetic beads and detection antibodies for detecting rat IL-2
171-L1010M	Bio-Plex Pro Rat Cytokine IL-4 Set , 1 x 96-well, includes coupled magnetic beads and detection antibodies for detecting rat IL-4
171-L1011M	Bio-Plex Pro Rat Cytokine IL-5 Set , 1 x 96-well, includes coupled magnetic beads and detection antibodies for detecting rat IL-5
171-L1012M	Bio-Plex Pro Rat Cytokine IL-6 Set , 1 x 96-well, includes coupled magnetic beads and detection antibodies for detecting rat IL-6
171-L1013M	Bio-Plex Pro Rat Cytokine IL-7 Set , 1 x 96-well, includes coupled magnetic beads and detection antibodies for detecting rat IL-7
171-L1014M	Bio-Plex Pro Rat Cytokine IL-10 Set , 1 x 96-well, includes coupled magnetic beads and detection antibodies for detecting rat IL-10
171-L1015M	Bio-Plex Pro Rat Cytokine IL-12(p40) Set , 1 x 96-well, includes coupled magnetic beads and detection antibodies for detecting rat IL-12(p40)
171-L1016M	Bio-Plex Pro Rat Cytokine IL-12(p70) Set , 1 x 96-well, includes coupled magnetic beads and detection antibodies for detecting rat IL-12(p70)
171-L1017M	Bio-Plex Pro Rat Cytokine IL-13 Set , 1 x 96-well, includes coupled magnetic beads and detection antibodies for detecting rat IL-13
171-L1018M	Bio-Plex Pro Rat Cytokine IL-17 Set , 1 x 96-well, includes coupled magnetic beads and detection antibodies for detecting rat IL-17
171-L1020M	Bio-Plex Pro Rat Cytokine M-CSF Set , 1 x 96-well, includes coupled magnetic beads and detection antibodies for detecting rat M-CSF
171-L1021M	Bio-Plex Pro Rat Cytokine MIP-1α Set , 1 x 96-well, includes coupled magnetic beads and detection antibodies for detecting rat MIP-1 α
171-L1022M	Bio-Plex Pro Rat Cytokine MIP-2 Set , 1 x 96-well, includes coupled magnetic beads and detection antibodies for detecting rat MIP-2
171-L1023M	Bio-Plex Pro Rat Cytokine MIP-3α Set , 1 x 96-well, includes coupled magnetic beads and detection antibodies for detecting rat MIP-3 α
171-L1024M	Bio-Plex Pro Rat Cytokine RANTES Set , 1 x 96-well, includes coupled magnetic beads and detection antibodies for detecting rat RANTES
171-L1025M	Bio-Plex Pro Rat Cytokine TNF-α Set , 1 x 96-well, includes coupled magnetic beads and detection antibodies for detecting rat TNF- α
171-L1026M	Bio-Plex Pro Rat Cytokine VEGF Set , 1 x 96-well, includes coupled magnetic beads and detection antibodies for detecting rat VEGF

* Singleplex sets require a reagent kit (171-304070, 171-304070M, or 171-304071) and standards (171-NZ0001 or 171-NZ0501).

Ordering Information

Catalog # Description

Bio-Plex Pro Reagent Kits

- 171-304070 **Bio-Plex Pro Reagent Kit**, 1 x 96-well, includes assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, filter plate, sealing tape, standard diluent, sample diluent
- 171-304070M **Bio-Plex Pro Reagent Kit with Flat-Bottom Plate**, 1 x 96-well, includes assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, flat-bottom plate, sealing tape, standard diluent, and sample diluent; for use in magnetic workflows
- 171-304071 **Bio-Plex Pro Reagent Kit**, 10 x 96-well kit, includes assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, ten 96-well filter plates, sealing tape, standard diluent, sample diluent

Bio-Plex Pro Rat Standards

- 171-NZ0001 **Bio-Plex Pro Rat Standard**, Pkg of 1 vial, standard for detecting 30 rat targets; compatible with rat cytokine and rat diabetes assays
- 171-NZ0501 **Bio-Plex Pro Rat Standards**, Pkg of 50 lot-matched vials, standard for detecting 30 rat targets; compatible with rat cytokine and rat diabetes assays

Bio-Plex Pro Wash Stations and Accessories

- 300-34376 **Bio-Plex Pro Wash Station**, includes magnetic plate carrier, waste bottle, 2 buffer bottles
- 300-34377 **Bio-Plex Pro II Wash Station**, includes magnetic plate carrier, vacuum manifold plate carrier, waste bottle, 2 buffer bottles
- 171-025001 **Bio-Plex Pro Flat-Bottom Plates**, 40 x 96-well plates
- 171-304500 **Bio-Plex Wash Buffer**, 1.5 L

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The Bio-Plex suspension array system includes fluorescently labeled microspheres and instrumentation licensed to Bio-Rad Laboratories, Inc. by the Luminex Corporation.



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Life Science
Group

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