Luminex® Bead-Based Multiplex Kits
Screening and Performance Assays
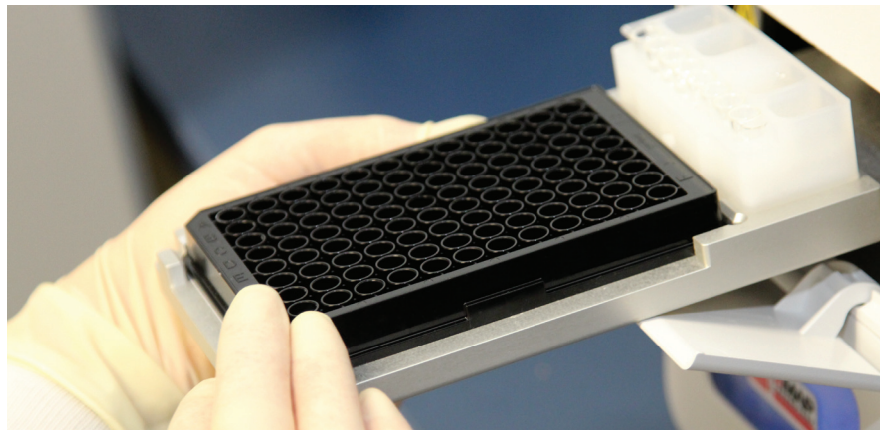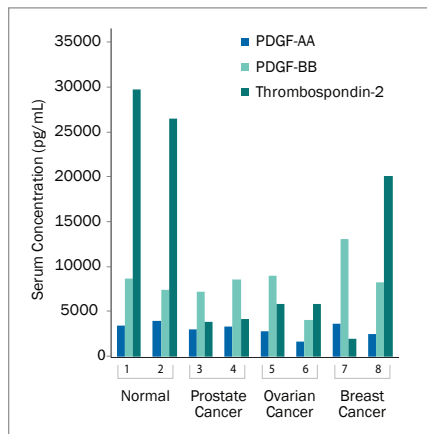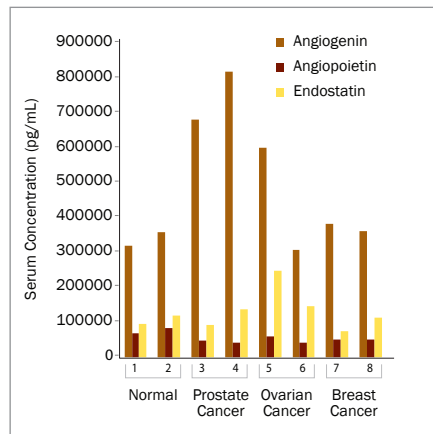

R&D SYSTEMS®

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RnDSystems.com

The Benefits of Multiplexing

Examining multiple factors simultaneously in a single sample volume, also known as multiplexing, can provide numerous benefits to the user.

- **Maximizes limited sample**: Multiplexing allows the user to maximize data collection from a small sample volume.

- **Minimizes experimental variability**: Examining multiple factors at one time removes a layer of variability from data, as the sample is processed only once and multiple data points are derived from a single manipulation.

- **Optimizes productivity**: Allowing users to collect multiple data points while minimizing sample preparation and processing saves time and generates high volumes of data.

R&D Systems Luminex® Bead-Based Assays for Multiplexing

R&D Systems offers two bead-based multiplex immunoassay formats utilizing Luminex xMAP® microparticle technology allowing users to better tailor assay selection to their individual research needs. R&D Systems Luminex assays are specifically designed to optimize the benefits and overcome the challenges of multiplexing.

R&D Systems Luminex Screening Assays

Luminex Screening Assays from R&D Systems are designed to maximize multiplexing capacity and flexibility while maintaining assay specificity. Learn more on page 10.

- **Largest Luminex Multiplex Available**: simultaneously analyze up to 100 analytes

- **Flexible Analyte Selection**: choose from over 175 analytes

- **Unique Analytes Offered**: over 50 analytes are exclusively available from R&D Systems

- **Rapidly Expanding Menu**: new analytes are released monthly

- **Polystyrene or Magnetic Options**: all analytes are available in either the polystyrene or magnetic microparticle format

R&D Systems Luminex Performance Assays

Luminex Performance Assays from R&D Systems are designed to maximize assay accuracy and precision while preserving the benefits of multiplexing. Learn more on page 22.

- **Accurate and Reproducible Results**: panel development and validation testing are similar to R&D Systems gold-standard Quantikine® ELISA assays

- **Polystyrene or Magnetic Options**: select panels are available in either the polystyrene or magnetic microparticle format

- **User-Defined Analyte Selection**: choose analytes from established panels and select "premixed" or "end-user mixed" options

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R&D Systems Luminex Immunoassay Principle

Principle Overview

Luminex assays from R&D Systems are bead-based multianalyte profiling kits for detecting protein analytes in biological fluids. The kits utilize color-coded polystyrene or superparamagnetic microparticles coated with antibodies that recognize the specific target analytes. The different analyte-specific beads are mixed and incubated with the sample. Captured analytes are subsequently detected using a cocktail of biotinylated detection antibodies specific to each analyte and a streptavidin-phycoerythrin conjugate.

Analyte

- Target Analyte
- Capture Antibody
- Luminex Bead
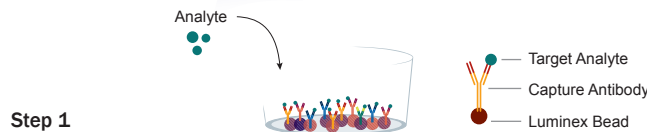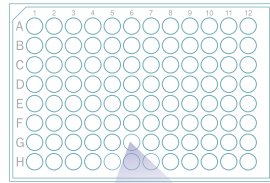
Step 1

The sample is added to a mixture of color-coded beads, pre-coated with analyte-specific capture antibodies. The antibodies bind to the analytes of interest.

Biotin
Detection Antibody

PE Streptavidin-PE

- Streptavidin-PE
- Biotin
- Detection Antibody
- Target Analyte
- Capture Antibody
- Luminex Bead
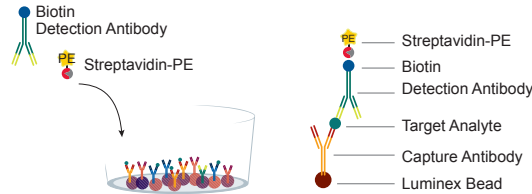
Step 2

Biotinylated detection antibodies specific to the analytes of interest are added and sandwich the analyte between the capture and detection antibodies. Phycoerythrin (PE)-conjugated streptavidin is added and binds to the biotinylated detection antibodies.

Polystyrene or Magnetic

- Streptavidin-PE
- Biotin
- Detection Antibody
- Target Analyte
- Capture Antibody
- Luminex Bead

Magnetic

Light
LED (621 nm)   LED (511 nm)

- Streptavidin-PE
- Biotin
- Detection Antibody
- Target Analyte
- Capture Antibody
- Luminex Bead
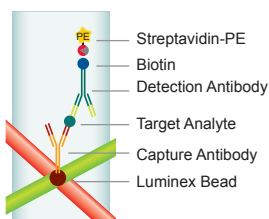
Step 3

Polystyrene or magnetic beads are read on a dual-laser flow-based detection instrument, such as the Luminex 100/200™, Luminex FLEXMAP3D®, or the equivalent Bio-Rad® BioPlex® analyzers. One laser classifies the bead and identifies the analyte being detected. The second laser determines the magnitude of the PE-derived signal, which is in direct proportion to the amount of analyte bound.
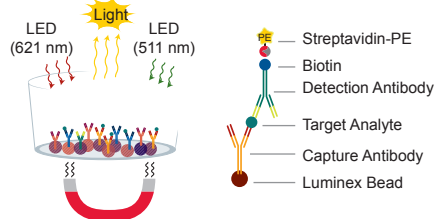
In addition to the Luminex 100/200, Luminex FLEXMAP3D, or the equivalent Bio-Rad Bio-Plex analyzers, magnetic beads can also be read using the Luminex or Bio-Rad MAGPIX® Analyzer. A magnet in the MAGPIX analyzer captures and holds the magnetic beads in a monolayer, while two spectrally distinct light-emitting diodes (LEDs) illuminate the beads. One LED identifies the analyte that is being detected, and the second LED determines the magnitude of the PE-derived signal. A CCD camera captures images of each well.

Luminex xMAP Microparticle Technology

xMAP technology by Luminex utilizes color-coded microparticles that incorporate different proportions of two dyes. The dyes can be excited by a laser at a single wavelength to provide a distinct spectral signature to each of 100 bead types or "regions." This technology allows multiplexing of up to 100 assays simultaneously.
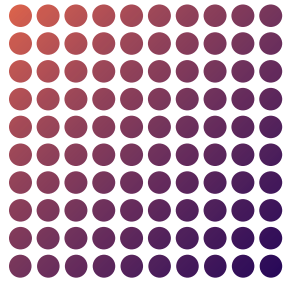
For more information on Luminex xMAP Microparticle technology, visit www.luminexcorp.com/TechnologiesScience/xMAPTechnology

Luminex Instrumentation

R&D Systems Luminex Assays are compatible with all Luminex instrumentation systems. These systems can be obtained from Luminex instrumentation distributors. For more information on Luminex instrumentation and to find a distributor, please visit www.luminexcorp.com/Products/Instruments.

Luminex 100/200™(Bio-Plex® 200)*

Optics	Lasers/APDs/PMTs
Hardware	Flow Cytometry based
Bead Compatibility	Magnetic/Polystyrene
Multiplex Capacity	100 (80 for MagPlex)
Dynamic Range	3.5 logs

MAGPIX™ (Bio-Plex MAGPIX)*

Optics	LED/CCD Camera
Hardware	Fluorescent Imager
Bead Compatibility	Magnetic
Multiplex Capacity	50
Dynamic Range	3.5 logs

FLEXMAP 3D® (Bio-Plex 3D®)*

Optics	Lasers/APDs/PMTs
Hardware	Flow Cytometry based
Bead Compatibility	Magnetic/Polystyrene
Multiplex Capacity	500
Dynamic Range	4.5 logs

* Luminex Screening and Performance Assays from R&D Systems are compatible with all Luminex instrumentation, including Bio-Plex instruments from Bio-Rad.

Unique Multiplex Optimization Challenges

The simultaneous detection of multiple protein analytes presents many challenges. This includes assay interference and the need for optimized, yet multipurpose diluents. R&D Systems recognizes these unique difficulties. The diluents and antibody pairs used in our Luminex Screening and Performance Assays are carefully developed and tested to ensure optimal analyte detection.

Multipurpose Diluents

Diluents used in multiplex assays may not be optimized for each analyte to the same degree that a diluent selected for a single analyte is. The most favorable conditions for promoting specific antibody/analyte binding and minimizing interference from other components will vary for each antibody/analyte set and for each sample type. Diluents provided with R&D Systems Luminex Performance Assays have been tested and specifically formulated for the select analytes within each panel. The Luminex Screening Assays provide diluents formulated for the widest possible variety of analyte combinations.

Interference, Non-specific Binding, and Cross-reactivity

Reagents provided in R&D Systems Luminex Assays are carefully designed and tested to **minimize assay interference and ensure an optimally functional sandwich immunoassay** (Figure 1). Immunoassay interference occurs when a substance within the assay prevents the accurate detection of the target analyte. Immunoassay interference can occur due to nonspecific antibody binding, antibody cross-reactivity, or antibody interference. In addition, complex sample matrices, such as serum and plasma, can often contain interfering factors. Interfering factors may also be introduced to biological samples via the reagents or equipment used. **Interference, no matter the mechanism, can result in either reduced or elevated signal relative to the actual concentration of target analyte**.

Figure 1. Optimally Functional Sandwich Immunoassay
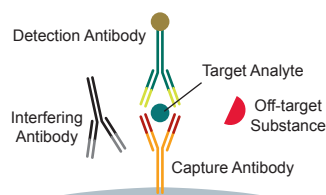
Non-specific binding occurs in an immunoassay when the antibody pair interacts with the sample container or other assay surfaces and contributes to background (Figure 2). Non-specific binding to microparticles, microplates, or other assay surfaces can be reduced by blocking. Diluents provided with R&D Systems Luminex Screening and Performance assays contain assay-optimized blocking reagents to ensure low non-specific binding.

Figure 2. Examples of Non-Specific Binding in an Immunoassay
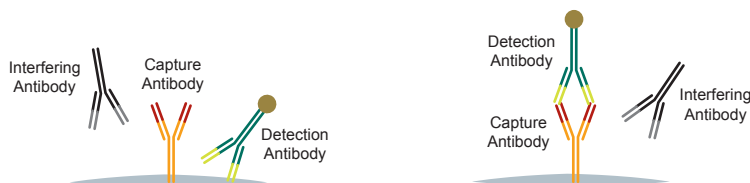
Cross-reactivity, the interaction of the antibody pair with a molecule other than the targeted analyte, can be caused by either the capture antibody or the detection antibody and often occurs when proteins in the sample are structurally similar to the analyte of interest (Figure 3). Optimizing antibodies so as to avoid cross-reactivity with substances within the biological sample is often challenging. R&D Systems carefully selects and exhaustively tests our in-house developed antibody pairs used in the Screening and Performance Luminex assays to ensure analyte specificity (Figure 7 on page 13).

Figure 3. Cross-Reactivity in an Immunoassay
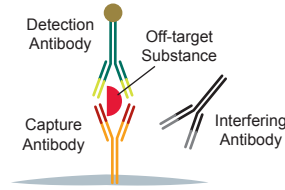
Antibody interference occurs when endogenous antibodies within samples cross-link with assay antibodies Figure 4; A-C) or substances within the sample (Figure 4; D, E) and prevent proper target-analyte binding to both the capture and detection antibodies. Common antibody-interfering substances in biological samples include human anti-mouse antibodies (HAMA) and rheumatoid factor (RF) antibodies as well as any substance present in exceptionally high concentrations. Diluents provided with R&D Systems Luminex Screening and Performance Assays are designed to prevent antibody interference from HAMA and RF in biological samples (See Table 1).

Figure 4. Examples of Antibody Interference in an Immunoassay

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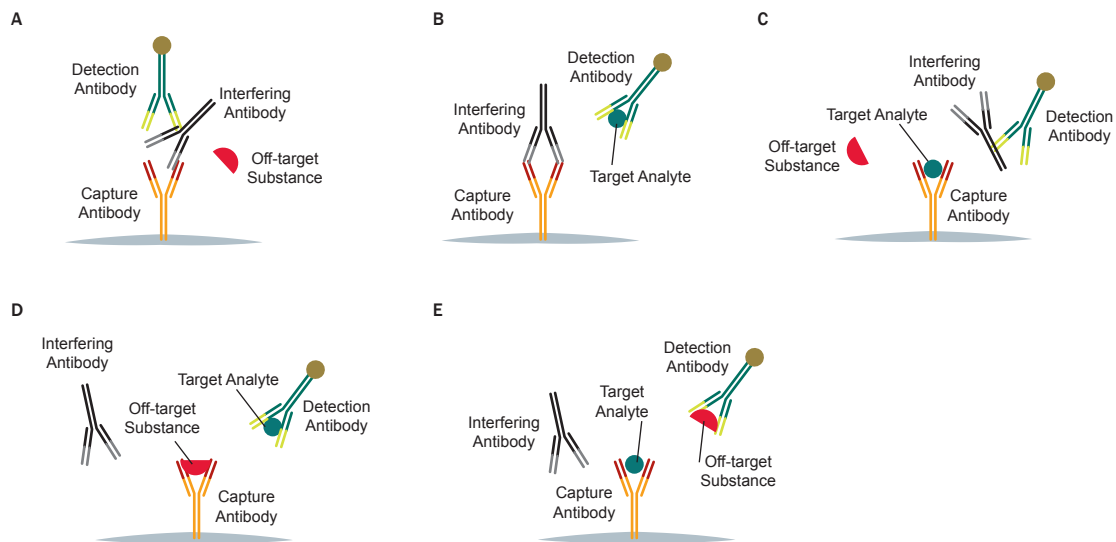
Table 1. Common Interfering Substances Lead to False Positives in Competitor Luminex Assays

Normal					
Analyte	R&D Systems Luminex Performance Assay	R&D Systems Luminex Screening Assay	Competitor 1	Competitor 2	Competitor 3
TNF-α	—	—	—	—	—
IFN-γ	—	—	—	—	—
GM-CSF	—	—	—	—	—
IL-10	—	—	—	+	—
IL-2	—	—	—	—	—
IL-4	—	—	—	—	—
IL-5	—	—	—	—	—
HAMA-high					
Analyte	R&D Systems Luminex Performance Assay	R&D Systems Luminex Screening Assay	Competitor 1	Competitor 2	Competitor 3
TNF-α	—	—	—	—	—
IFN-γ	—	—	—	++	—
GM-CSF	—	—	—	+++	—
IL-10	—	—	—	++	—
IL-2	—	—	—	++	—
IL-4	—	—	—	—	—
IL-5	—	—	—	—	—
RF-high					
Analyte	R&D Systems Luminex Performance Assay	R&D Systems Luminex Screening Assay	Competitor 1	Competitor 2	Competitor 3
TNF-α	—	—	—	++	+
IFN-γ	—	—	—	++	—
GM-CSF	—	—	—	+++	—
IL-10	—	—	—	+	—
IL-2	—	—	—	++	—
IL-4	—	—	—	++	+
IL-5	—	—	—	+	—

Serum samples confirmed to be Human Anti-Mouse Antibody-high (13-41.5 ng/mL; HAMA-high) or Rheumatoid Factor-high (30–42 IU/mL; RF-high) were purchased from ProMedDx. Normal serum was collected from apparently healthy donors. Seven analytes common to Luminex panels from R&D Systems and leading companies were run simultaneously. High concentrations of HAMA or RF caused false positive readings (i.e., measureable signal within the standard curve; +) by Luminex assays manufactured by two of the three competitor assays. No false positives were observed using the R&D Systems assays.

Techniques to Evaluate Multiplex Accuracy

Interfering factors in an assay can result in the inaccurate measurement of the target analyte. Erroneous results in the form of artificially elevated or reduced analyte values can lead to incorrect experimental conclusions, which can lead to inappropriate subsequent experiments or the formation of flawed hypotheses. Assay validation methods, including linearity of dilution and recovery, can help to detect immunoassay interference and ensure accurate analyte measurement. R&D Systems tests linearity of dilution for Luminex Screening and Performance Assays for all validated sample types and performs spike recovery analysis for all Luminex Performance Assays to ensure accurate analyte measurement.

Sample Linearity of Dilution

R&D Systems Luminex Screening and Performance Assays are tested for assay linearity on validated sample types, and results indicate the accuracy of the determined analyte concentration. The principle of assay linearity maintains that after corrections for the dilution factor, sample dilutions should always derive the same final analyte concentration for a sample. **Interfering factors present in the sample matrix or the diluent can compromise assay linearity to varying degrees depending upon the magnitude of dilution** (Figure 5). Performing linearity of dilution curves can determine if interfering substances are present within biological samples and ensure that the final analyte concentrations detected are an accurate representation of the actual analyte concentration, regardless of the dilution factor. Additionally, as samples often need to be diluted to varying degrees so that the analyte of interest falls in the dynamic range of the standard curve, sample linearity of dilution ensures that the assay will allow for the comparison of sample values generated from samples run at different dilutions. In sample linearity of dilution experiments, serially diluted samples are assayed to determine if the expected concentrations of analyte are detected in dilution-corrected samples. Assay interference due to common interfering factors such as HAMA and RF can be detected using linearity of dilution in under-optimized immunoassays (Table 2).

Figure 5. Interfering Factors can Affect Linearity of Dilution
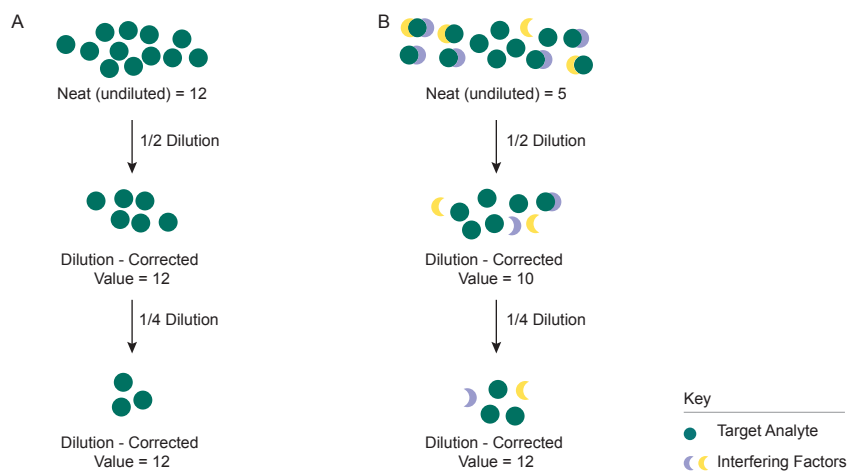
A. The expected results from a linearity of dilution experiment when no interfering factors are present in the sample or diluent matrix. B. The potential results from a linearity of dilution experiment if interfering factors are present in the sample matrix or diluent. Factors in complex matrices can interfere with analyte detection. This effect may be revealed by unexpected linear dilution values.

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Table 2. R&D Luminex Assays Show Linearity of Dilution Similar to Competitor Assays

Analyte	Sample Type	R&D Systems Luminex Performance Assay	R&D Systems Luminex Screening Assay	Competitor 1	Competitor 2	Competitor 3
TNF-α	Normal	107	99	125	122	112
	HAMA-high	115	104	108	123	123
	RF-high	104	83	118	155	ND
IFN-γ	Normal	115	90	130	131	119
	HAMA-high	105	97	106	107	127
	RF-high	102	108	115	111	121
GM-CSF	Normal	94	90	91	125	104
	HAMA-high	96	96	102	125	125
	RF-high	97	101	98	120	118
IL-10	Normal	102	99	111	126	111
	HAMA-high	97	90	108	120	117
	RF-high	97	61	112	111	107
IL-2	Normal	93	92	116	111	92
	HAMA-high	96	93	116	108	105
	RF-high	96	72	122	106	102
IL-4	Normal	104	90	110	122	97
	HAMA-high	108	95	107	111	125
	RF-high	102	103	118	111	113
IL-5	Normal	115	98	120	114	116
	HAMA-high	104	86	114	101	125
	RF-high	100	91	107	95	113

Sera from normal, HAMA-high, or RF-high individuals were pooled and spiked with either recombinant protein standard or natural protein from cell culture supernatants. Samples were assayed at the recommended dilution and further serially diluted (1:2). Results are presented as average percent observed from expected. Values between 70–130% indicate good assay linearity. Results outside of that range are highlighted in blue.

Recovery

Recovery experiments help determine whether the diluent was able to overcome any interfering factors in the sample matrix that would otherwise hinder the assay's ability to accurately assess the concentration of the target analyte in reference to the standard curve. To conduct recovery experiments, a known concentration of either recombinant or natural target analyte is added (spiked) to the sample. The spiked samples are assayed to determine whether the expected concentrations of analyte were detected (i.e., recovered) when compared to the known spike concentration. Recovery of added proteins in R&D Systems Luminex Performance Assays is typically between 75–125% in each validated sample type; specific data are available in the product datasheet for each analyte.

Luminex Screening Assays

Luminex Screening Assays offer our widest selection of analytes for bead-based multianalyte profiling using cell culture supernatants, serum, or plasma samples. Screening Assays are ideal for researchers needing to evaluate multiple analytes for trends in protein expression in disease states or following treatment. (See data obtained with the Screening Assay in Figure 8 on page 14.) They are also valuable for examining combinations of analytes not available in defined panels. Luminex Screening Assays allow the simultaneous profiling of up to 100 biomarkers when using polystyrene microparticles or 50 biomarkers when using magnetic microparticles. The analytes for this user-defined multiplex assay are available from a rapidly expanding menu and are supplied as premixed kits.

Features

- **Flexible:** Simultaneously profile up to 100 analytes of your choice when using polystyrene beads or up to 50 analytes when using magnetic beads.

- **Economical:** Cost-effectively assay multiple markers.

- **Versatile:** Choose from a rapidly expanding analyte menu, including many unique analytes.

- **Species Variety:** Find kits designed for human, mouse, and rat analytes.

- **Rapid:** Run a multiple analyte assay in 3–3.5 hours.

- **Efficient:** Assay multiple analytes in a small sample volume (< 50 μL).

Validation and Testing

Luminex Screening assays are validated for use with cell culture supernatants, plasma, or serum. All Screening Assays are tested for sensitivity, intra-assay precision, inter-assay precision, and to ensure assay linearity for validated sample types. Antibody pairs are selected and tested to confirm the parallel detection of natural and recombinant standard protein and to ensure the accurate determination of target analyte within biological samples (Figure 6). Assays for each target analyte are screened against all target analytes to confirm low antibody cross-reactivity (Figure 7 on page 13).

Formats

All analytes are available in polystyrene or magnetic bead formats.

- **Polystyrene beads:** Assays using polystyrene beads are compatible with the Luminex 100, Luminex 200, Luminex FLEXMAP 3D, Bio-Plex 200, or Bio-Plex 3D analyzers.

- **Magnetic beads:** Assays using magnetic beads are compatible with the Luminex MAGPIX, Luminex 100, Luminex 200, Luminex FLEXMAP 3D, Bio-Plex MAGPIX, Bio-Plex 200, or Bio-Plex 3D analyzers.

Kit Contents

Luminex Screening Assay Kits contain a premixed cocktail of antibody-coated microparticles, premixed biotinylated detection antibodies, standard cocktail(s), microparticle diluent, biotin antibody diluent, standard/sample diluent, wash buffer, Streptavidin-PE, filter- or flat-bottom 96-well microplate, foil plate sealers, mixing bottles, and Certificate of Analysis.

Figure 6. Luminex Screening Assays Accurately Detect Natural Proteins
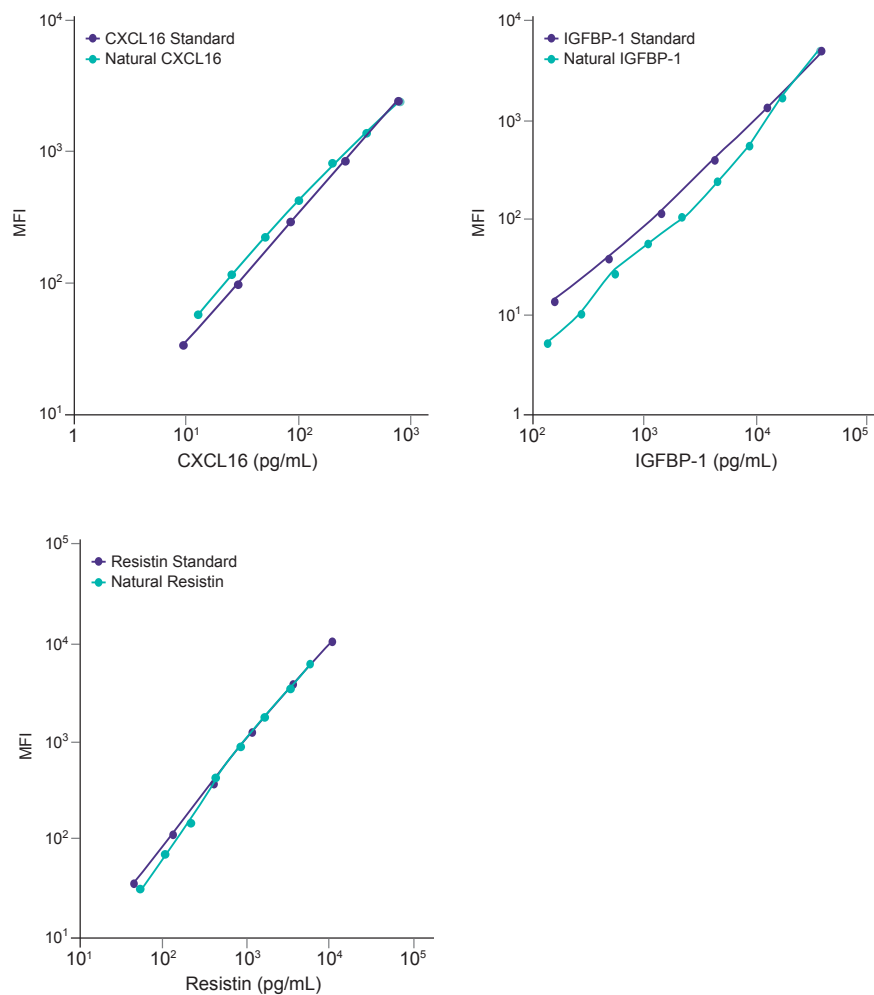
All Luminex Screening Assays are tested to ensure that they detect natural proteins in parallel with detection of the recombinant protein standard. Representative dilution curves detecting natural or recombinant standard Resistin, CXCL16, and IGFBP-1 are shown. Parallel detection of natural and recombinant standard proteins ensures that the concentration of analyte within a biological sample can be accurately determined in comparison to the recombinant protein used to generate the standard curve.

Key for Figure 7

Position	Molecule
1	Adiponectin/Acrp30
2	Aggrecan
3	Angiopoieitin-2
4	APP
5	BAFF/BLyS/TNFSF13B
6	BCMA
7	CXCL13/BLC/BCA-1
8	BMP-2
9	BMP-4
10	BMP-9
11	CD14
12	CD163
13	CD27/TNFRSF7
14	CD30/TNFRSF8
15	CD40 Ligand/TNFSF5
16	Chitinase 3-like 1/CHI3L1
17	Cripto-1
18	C-Reactive Protein/CRP
19	Cardiac Troponin I
20	CXCL16
21	DcR3/TNFRSF6B
22	Dkk-1
23	DR3/TNFRSF25
24	TRAIL R2/DR5/TNFRSF10B
25	EGF
26	CXCL5/ENA-78
27	ENPP-2/Autotaxin
28	CCL26/Eotaxin-3
29	EphA2
30	E-Selectin/CD62E
31	Complement Factor D
32	Fas/TNFRSF6
33	Fas Ligand/TNFSF6
34	FGF basic
35	FGF-21
36	FLRG
37	Follistatin
38	Galectin-3
39	G-CSF
40	GDF-15
41	GM-CSF
42	CXCL1/Gro-α
43	HB-EGF
44	HGF
45	Human Growth Hormone/hGH
46	ICAM-1/CD54
47	IFN-γ
48	IFN-γ R1
49	IGFBP-1
50	IGFBP-3
51	IL-1ra/IL-1F3
52	IL-1 RI
53	IL-1 RII
54	IL-10
55	IL-12 p70
56	IL-13
57	IL-17
58	IL-17F
59	IL-18 BPa
60	IL-19
61	IL-1α
62	IL-1β
63	IL-2
64	IL-22
65	IL-23
66	IL-27
67	IL-28A
68	IL-2 Rα
69	IL-31
70	IL-33
71	IL-34
72	IL-4
73	IL-5
74	IL-6
75	IL-6 R
76	IL-8
77	IL-9
78	CXCL10/IP-10
79	CXCL11/I-TAC
80	Leptin
81	CCL2/MCP-1
82	CCL8/MCP-2
83	CCL7/MCP-3
84	CCL13/MCP-4
85	M-CSF
86	CCL22/MDC
87	MFG-E8
88	CXCL9/MIG
89	CCL3/MIP-1α
90	CCL4/MIP-1β
91	CCL20/MIP-3α
92	MMP-1
93	MMP-12
94	MMP-13
95	MMP-2
96	MMP-3
97	MMP-7
98	MMP-8
99	MMP-9
100	Myeloperoxidase/MPO
101	Cardiac Myoglobin
102	NRG1-β 1/HRG1-β 1
103	Oncostatin M/OSM
104	P-Selectin/CD62P
105	Serpin E1/PAI-1
106	CCL18/PARC
107	Proprotein Convertase 9/PCSK9
108	Periostin/OSF-2
109	CXCL4/PF4
110	Progranulin
111	RAGE
112	TRANCE/RANK L/TNFSF11
113	CCL5/RANTES
114	Renin
115	Resistin
116	ROBO4
117	SHBG
118	SOST
119	SPARC
120	SP-D
121	ST2/IL-1 R4
122	TACI/TNFRSF13B
123	CCL17/TARC
124	Thrombospondin-2
125	Tenascin C
126	TFPI
127	Tie-1
128	Tie-2
129	TNF RI/TNFRSF1A
130	TNF RII/TNFRSF1B
131	TNF-α
132	Thrombopoietin/Tpo
133	TRAIL R3/TNFRSF10C
134	Uteroglobin
135	VAP-1
136	VCAM-1
137	VEGF
138	VEGF R1
139	VEGF R3

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Figure 7. R&D Systems Luminex Screening Assays are Analyte-Specific
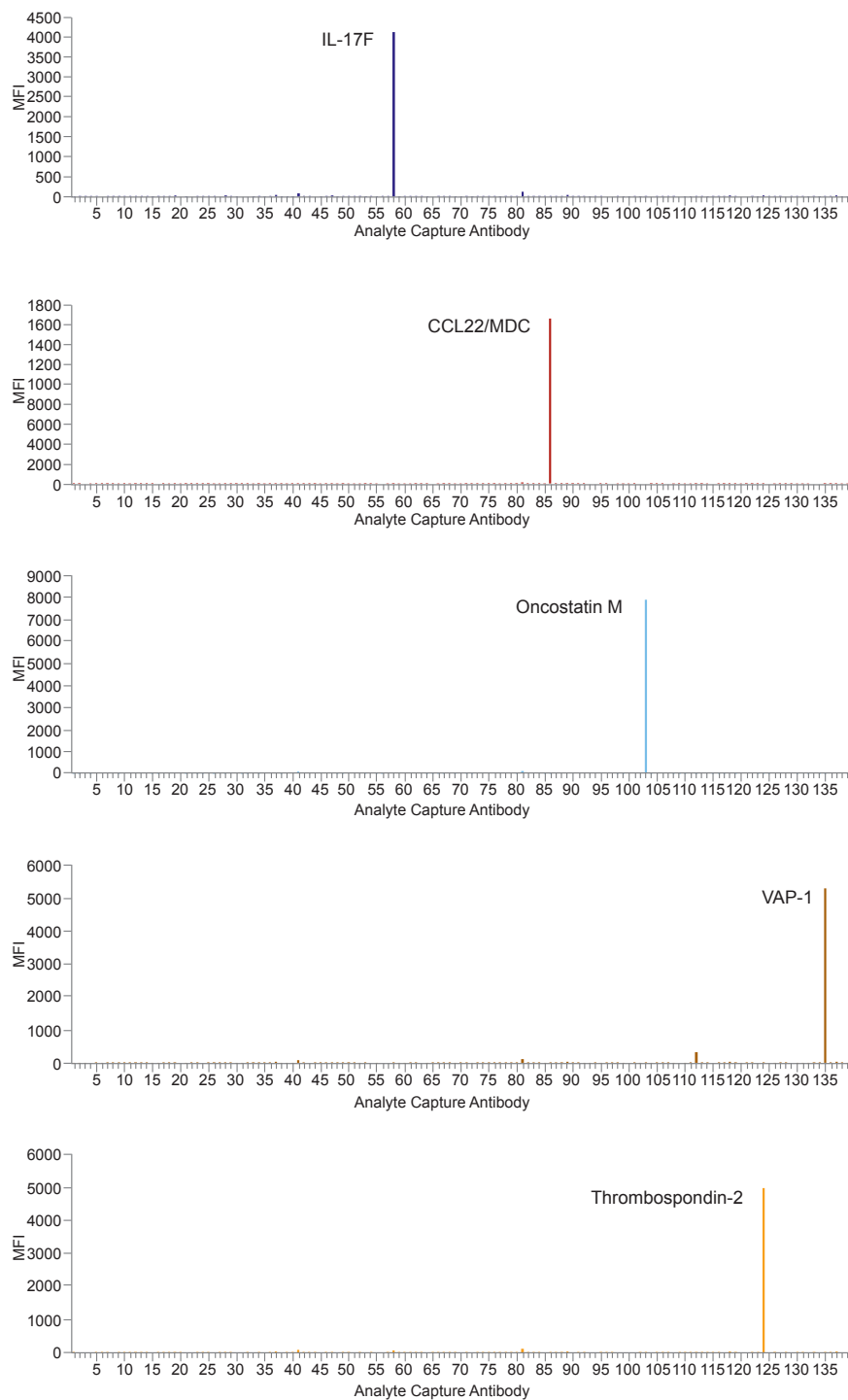
Luminex Screening Assay analtyes, capture antibodies, and detection antibodies are individually tested to ensure minimal cross-reactivity between analytes and antibody pairs. Oncostatin M, CCL22/MDC, VAP-1, IL-17F, and Thrombospondin-2 detection antibodies were tested against 139 capture antibodies and proteins in sets of approximately 20. No cross-reactivity was observed between detection antibodies and off-target proteins.

Figure 8. R&D Systems Luminex Screening Assay Used to Detect Proteins Secreted by Various Breast Cancer Cell Lines

	MCF-7	MDA-MB-231	SK-BR-3	T47D	ZR-75-1
IL-6	1.88	130	0	0	0
MMP-3	0	45.2	0	0	0
CXCL8/IL-8	6.95	1300	11.6	0	0
MMP-1	31.6	<HIGH>	4.71	0	0
MMP-2	551	1110	965	353	1700
CCL2/MCP-1	0	3.09	532	25.4	0
VEGF	729	1970	1420	466	4880
MMP-13	17.4	38.3	733	22.6	0
MMP-12	1310	1360	1130	1140	1320
CCL5/RANTES	25.5	0	0	0	0
IL-2	44.7	64.3	64.3	28.1	26.2
Adiponectin	1280	1620	1250	867	1180
FGF basic	29.6	32.4	26.1	24.3	29.6
G-CSF	0	40.1	0	0	0
GDF-15	547	0	91.7	10.4	139
Aggrecan	510	555	490	400	443
IL-23	1250	1220	1100	1140	1340
CXCL1/Groα	32	168	42	48.3	44.4
FGF-21	17800	19700	18400	17400	18100
CHI3-L1	145	367	289	131	301
EGF	66.3	66.1	59.1	73.7	64.9
Angiopoietin-2	300	480	260	235	180
Dkk-1	5080	1310	404	270	0
Galectin-3	1870	82.4	0	94.4	500
IL-22	224	323	302	283	324
CCL8/MCP-2	52.4	121	197	0	0
Cardiac Myoglobin	7.6	0	31.8	3.27	101
Serpin E1/PAI-1	2630	16200	46000	2.04	7.5
Proprotein Convertase 9	3820	3560	2970	2770	4140
DcR3	5300	4630	3780	4720	4310
TNF RI	525	163	144	237	130

Key	1:243–1:81	1:81–1:27	1:27–1:3	1:1 and above

Low Concentration ⟶ High Concentration

The MCF-7, MDA-MB-231, SK-BR-3, T47D, and ZR-75-1 breast cancer cell lines were cultured under optimal cell line-specific culture conditions. Cell culture supernatants were collected and analyzed for the secretion of 99 protein analytes using a single Luminex Screening Assay. Sixty-eight analytes were undetectable. Data are presented in pg/mL. Coloration indicates the sample concentration with regard to the standard curve for each analyte, which was generated using 1:3 serial dilution of the standards provided with each Luminex Screening Assay. The standard curve ranged between 1:1–1:243 relates to the supplied protein standard.

Screening Assays Available

Human Screening Analytes

Analyte	Sensitivity (Mean Minimum Detectible Dose; pg/mL)	Standard Curve Range* (pg/mL)	Starting Sample Dilution			Bead Region	
			Cell Culture Supernatents	Serum	Heparin Plasma	Polystyrene	Magnetic
Adiponectin/Acrp30	148	1,346–327,013	1:2	1:200	1:200	25	44
Aggrecan ■	249	200–48,546	1:2	1:2	1:2	47	75
α-Fetoprotein	205	1,021–248,000	1:2	1:2	1:2	41	
Amphiregulin	131	919–223,400	1:2	1:2	1:2	21	37
Angiopoietin-2 ■	17.1	120–29,175	1:2	1:2	1:2	61	26
Angiopoietin-like 3	23.0	185–45,000	1:2	1:2	1:2	42	
Angiopoietin-like 4	86.0	3,461–841,000	1:2	1:2	1:2	43	
APP ■	349	6,296–1,530,000	1:2	1:2	1:2	21	39
BAFF/BLyS/TNFSF13B	5.8	53–12,900	1:2	1:2	1:2	62	27
BCMA ■	1.2	35–8,530	1:2	1:2	1:2	98	75
BMP-2 ■	3.6	19.9–4,832	1:2	1:2	1:2	43	67
BMP-4 ■	5	34.8–8,462	1:2	1:2	1:2	44	72
BMP-9	0.6	45.7–11,108	1:2	1:2	1:2	45	73
CA15-3	0.051 units/mL	0.148-36 units/mL	1:2	1:50	1:50	45	
CA125/MUC16	2.7	28.0–6,800	1:2	1:2	1:2	19	35
Calbindin D ■	12.3	25.3–6,150	1:2	1:2	1:2	17	33
Cardiac Myoglobin	1.3	19.3–4,700	1:2	1:50	1:50	74	42
Cardiac Troponin I/cTNI	14.9	103–25,000	1:2	1:2	1:2	80	48
CCL2/MCP-1	9.9	12.0–2,914	1:2	1:2	1:2	10	25
CCL3/MIP-1α	16.2	125–30,429	1:2	1:2	1:2	18	35
CCL4/MIP-1β	5.8	33.5–8,140	1:2	1:2	1:2	20	37
CCL5/RANTES	1.8	18.2–4,419	1:2	1:50	1:50	19	36
CCL7/MCP-3	3.2	41.2–10,000	1:2	1:2	1:2	69	37
CCL8/MCP-2	1.8	19.3–4,700	1:2	1:2	1:2	71	37
CCL13/MCP-4	0.4	6.2–1,500	1:2	1:2	1:2	72	38
CCL17/TARC	8.9	98.8–24,000	1:2	1:2	1:2	38	63
CCL18/PARC ■	0.3	13.6–3,300	1:2	1:50	1:50	65	33
CCL20/MIP-3α	3.4	13.9–3,375	1:2	1:2	1:2	66	33
CCL22/MDC	8.5	53.3–13,000	1:2	1:2	1:2	68	36
CCL26/Eotaxin-3	1.6	20.6–5,000	1:2	1:2	1:2	75	45
CCL27/CTACK	0.421	4.94-1,200	1:2	1:2	1:2	47	
CD14 ■	39.6	256–62,200	1:2	1:200	1:200	64	29
CD27 ■	4.8	116–28,200	1:2	1:2	1:2	94	67
CD30 ■	0.1	1.8–438	1:2	1:2	1:2	88	61
CD40 ■	2.1	81.9–19,900	1:2	1:2	1:2	99	76
CD163 ■	530	3,292–800,000	1:2	1:2	1:2	62	28
Chemerin ■	69.0	0.333–81.0	1:2	1:2	1:2	46	
Chitinase 3-like 1 ■	3.3	332–80,783	1:2	1:2	1:2	57	20
Coagulation Factor XIV ■	23.1	306–74,400	1:2	1:50	1:50	20	36
Complement Factor D/ Adipsin	232	943–229,179	1:2	1:50	1:50	40	64

*A standard curve must be generated each time an assay is run utilizing values from the Certificate of Analysis provided with each Luminex Screening Assay.

Human Screening Analytes

■ Analyte available exclusively from R&D Systems

| Analyte | Sensitivity (Mean Minimum Detectible Dose; pg/mL) | Standard Curve Range* (pg/mL) | Starting Sample Dilution | | | Bead Region | |
			Cell Culture Supernatents	Serum	Heparin Plasma	Polystyrene	Magnetic
Cripto-1 ■	14.3	38.2–9,285	1:2	1:2	1:2	56	19
C-Reactive Protein	116	141–34,174	1:2	1:200	1:200	38	62
CXCL1/GROα	5.3	50.0–12,150	1:2	1:2	1:2	49	77
CXCL4/PF4	25.2	539–131,000	1:2	1:200	1:200	34	56
CXCL5/ENA-78	8.2	59.4–14,433	1:2	1:2	1:2	31	52
CXCL8/IL-8	1.8	15.9–3,863	1:2	1:2	1:2	5	18
CXCL9/MIG	23.8	831–202,000	1:2	1:2	1:2	30	52
CXCL10/IP-10	118	9.0–2,181	1:2	1:2	1:2	58	21
CXCL11/I-TAC	7.8	133–32,340	1:2	1:2	1:2	39	63
CXCL12/SFD-1α	1.70	13.2–3,200	1:2	1:2	1:2	60	
CXCL13/BLC/BCA-1	11.5	22.1–5,375	1:2	1:2	1:2	63	28
CXCL16 ■	0.4	9.5–2,300	1:2	1:2	1:2	71	39
DcR3 ■	55.9	605–147,000	1:2	1:2	1:2	84	54
DR3/TNFRSF25	58.6	683–166,000	1:2	1:2	1:2	95	30
Dkk-1	50.9	248–60,250	1:2	1:2	1:2	65	72
EGF	20	34.3–8,323	1:2	1:2	1:2	60	25
Endoglin/CD105	68.0	556–135,000	1:2	1:2	1:2	49	
Endothelin-1	1.31	9.47–2,300	1:2	1:2	1:2	50	
ENPP-2/Autotaxin ■	99.3	2,589–629,000	1:2	1:2	1:2	22	42
E-Selectin	18.8	468–113,646	1:2	1:2	1:2	26	45
FABP4	95.7	938–228,000	1:2	1:2	1:2	51	
EphA2	176	271–65,900	1:2	1:2	1:2	82	52
Epo	8.9	858–208,600	1:2	1:2	1:2	18	34
Fas	3.2	175–42,500	1:2	1:2	1:2	96	73
Fas Ligand/TNFSF6	1.2	20.2–4,900	1:2	1:2	1:2	73	39
FGF basic	6.5	22.0–5,340	1:2	1:2	1:2	28	47
FGF-21	27	441–107,092	1:2	1:2	1:2	52	13
FLRG ■	52	759–184,500	1:2	1:2	1:2	63	29
Flt-3 Ligand	1.50	12.3-3,000	1:2	1:2	1:2	52	
Follistatin	159	1,938–471,000	1:2	1:2	1:2	23	43
Galectin-3	1.7	19.0–4,625	1:2	1:50	1:50	68	34
G-CSF	4.1	37.5–9,114	1:2	1:2	1:2	33	54
GDF-15	1.2	50.4–12,247	1:2	1:2	1:2	41	65
GDNF	0.582	6.17-1,500	1:2	1:2	1:2	53	
GM-CSF	4.1	92.2–22,394	1:2	1:2	1:2	27	46
gp130	11.2	311-75,500	1:2	1:2	1:2	54	
Growth Hormone ■	15.3	80.7–19,600	1:2	1:2	1:2	24	44
HB-EGF	0.4	10.8–2,618	1:2	1:2	1:2	59	22
HGF	1	33.6–8,166	1:2	1:2	1:2	42	66
ICAM-1/CD54	87.9	3,011–731,629	1:2	1:2	1:2	37	61

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Screening Assays

For research use only. Not for use in diagnostic procedures.

Human Screening Analytes

■ Analyte available exclusively from R&D Systems

Analyte	Sensitivity (Mean Minimum Detectible Dose; pg/mL)	Standard Curve Range* (pg/mL)	Starting Sample Dilution			Bead Region	
			Cell Culture Supernatents	Serum	Heparin Plasma	Polystyrene	Magnetic
IFN-γ	0.4	11.3–2,739	1:2	1:2	1:2	14	29
IFN-γ R1 ■	0.1	2.7–647	1:2	1:2	1:2	85	55
IGFBP-1	42.6	159–38,600	1:2	1:2	1:2	70	38
IGFBP-3	281	3,247–789,000	1:2	1:2	1:2	25	45
IL-1α	0.9	9.5–2,319	1:2	1:2	1:2	21	38
IL-1β	0.8	11.3–2,734	1:2	1:2	1:2	13	28
IL-1ra/IL-1F3	18	32.3–7,857	1:2	1:2	1:2	15	30
IL-1 RI	4.5	86.8–21,100	1:2	1:2	1:2	90	63
IL-1 RII	18	163–39,600	1:2	1:2	1:2	89	62
IL-2	1.8	20.6–5,012	1:2	1:2	1:2	24	43
IL-2 Rα	1.3	27.0–6,550	1:2	1:2	1:2	77	47
IL-3	11.6	130–31,500	1:2	1:2	1:2	55	
IL-4	9.3	25.1–6,106	1:2	1:2	1:2	22	39
IL-5	0.5	13.8–3,357	1:2	1:2	1:2	32	53
IL-6	1.7	21.0–5,094	1:2	1:2	1:2	2	13
IL-6 Rα ■	0.6	71.2–17,300	1:2	1:2	1:2	61	27
IL-9	131	2,506–609,000	1:2	1:2	1:2	26	46
IL-10	1.6	9.4–2,290	1:2	1:2	1:2	9	22
IL-12 p70	20.2	285–69,199	1:2	1:2	1:2	35	56
IL-13	36.6	403–98,000	1:2	1:2	1:2	27	47
IL-17A	1.8	19.7–4,791	1:2	1:2	1:2	23	42
IL-17F	27.8	784–190,500	1:2	1:2	1:2	76	46
IL-18 BPa ■	1.9	86.4–20,990	1:2	1:2	1:2	54	15
IL-19 ■	64.3	295–71,608	1:2	1:2	1:2	46	74
IL-22	11.7	17.5–4,250	1:2	1:2	1:2	69	35
IL-23	283	1,129–274,338	1:2	1:2	1:2	48	76
IL-27	2.7	256–62,079	1:2	1:2	1:2	50	78
IL-28A/IFN-λ2	8.6	247–60,130	1:2	1:2	1:2	51	12
IL-31	9.7	65.4–15,900	1:2	1:2	1:2	70	36
IL-33	1.8	97.8–23,755	1:2	1:2	1:2	53	14
IL-34 ■	18.7	85.2–20,700	1:2	1:2	1:2	73	43
Insulin	9.91	36.2–8,800	1:2	1:2	1:2	44	
Kallikrein 3/PSA	8.30	123–30,000	1:2	1:2	1:2	56	
Kallikrein 5 ■	81.5	193–47,000	1:2	1:2	1:2	57	
Leptin	10.2	574–139,471	1:2	1:2	1:2	30	51
L-Selectin/CD62L	106	1,556-378,000	1:2	1:2	1:2	58	
M-CSF	38.1	333–81,000	1:2	1:2	1:2	28	48
MFG-E8 ■	35.7	486–118,000	1:2	1:2	1:2	29	51
MICA ■	5.4	134–32,500	1:2	1:2	1:2	2	12
MICB ■	35.8	254–63,000	1:2	1:2	1:2	4	14

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Screening Assays

Human Screening Analytes

■ Analyte available exclusively from R&D Systems

Analyte	Sensitivity (Mean Minimum Detectible Dose; pg/mL)	Standard Curve Range* (pg/mL)	Starting Sample Dilution			Bead Region	
			Cell Culture Supernatents	Serum	Heparin Plasma	Polystyrene	Magnetic
MIF	38.8	1,482–360,000	1:2	1:2	1:2	9	21
MMP-1	2.7	29.2–7,104	1:2	1:2	1:2	6	19
MMP-2	108	290–70,368	1:2	1:50	1:50	7	20
MMP-3	5.3	82.8–20,113	1:2	1:2	1:2	4	15
MMP-7	23.2	548–133,263	1:2	1:2	1:2	8	21
MMP-8	34.2	472–114,706	1:2	1:2	1:2	12	27
MMP-9	13.6	209–50,804	1:2	1:50	1:50	3	14
MMP-12	7.1	69.5–16,699	1:2	1:2	1:2	17	34
MMP-13	19	264–64,180	1:2	1:2	1:2	16	33
MPO	26.2	347–84,200	1:2	1:50	1:50	31	53
Nephrin	22.2	494–120,000	1:2	1:2	1:2	48	
NRG1-β1/HRG1-β1 ■	5.9	36.4–8,850	1:2	1:2	1:2	32	54
Oncostatin M (OSM)	44.3	370–90,000	1:2	1:2	1:2	64	30
PDGF-BB ■	0.200	10.7–2,600	1:2	1:50	1:50	59	
Pentraxin 3/TSG-14 ■	39.5	276–67,000	1:2	1:2	1:2	15	29
Periostin/OSF-2 ■	95.7	1,132–275,000	1:2	1:2	1:2	33	55
Progranulin ■	195	1,095–266,000	1:2	1:2	1:2	35	57
Proprotein Convertase 9/PCSK9 ■	246	1,038–252,175	1:2	1:2	1:2	76	44
P-Selectin	9	225–54,562	1:2	1:2	1:2	29	48
RAGE	7.2	232–56,250	1:2	1:2	1:2	77	45
Renin	25.8	321–78,000	1:2	1:2	1:2	36	61
Resistin	3	44.7–10,870	1:2	1:2	1:2	79	51
ROBO4 ■	1.5	94.2–22,900	1:2	1:2	1:2	81	51
SCF	1.4	70.0–17,000	1:2	1:2	1:2	13	27
Serpin E1/PAI-1	0.7	22.6–5,500	1:2	1:200	1:200	75	43
Serpin C1/Antithrombin-III	207	2,469–600,000	1:2	1:200	1:200	16	30
SHBG	705	10,578–2,570,560	1:2	1:50	1:50	78	46
SOST	7	19.7–4,775	1:2	1:2	1:2	79	47
SPARC ■	97.9	2,431–590,600	1:2	1:50	1:50	66	34
SP-D ■	26.5	185–45,000	1:2	1:2	1:2	37	62
ST2/IL-1 R4 ■	29.9	243–59,080	1:2	1:2	1:2	55	18
TACI ■	0.6	10.9–2,650	1:2	1:2	1:2	100	77
Tenascin C	6.6	41.2–10,000	1:2	1:2	1:2	67	35
TFPI ■	43.7	621–151,000	1:2	1:2	1:2	39	64
TfR ■	67.5	337–82,000	1:2	1:200	1:200	3	13
Thrombospondin-2 ■	30.7	288–70,000	1:2	1:2	1:2	80	52
Tie-1 ■	224	3144–764,000	1:2	1:2	1:2	91	64
Tie-2	16	311–75,600	1:2	1:2	1:2	86	56
TNF-α	1.2	24.8–6,020	1:2	1:2	1:2	1	12

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Human Screening Analytes Available

■ Analyte available exclusively from R&D Systems

Analyte	Sensitivity (Mean Minimum Detectible Dose; pg/mL)	Standard Curve Range* (pg/mL)	Starting Sample Dilution			Bead Region	
			Cell Culture Supernatents	Serum	Heparin Plasma	Polystyrene	Magnetic
TNF RI	41	155–37,600	1:2	1:2	1:2	93	66
TNF RII	0.5	5.7–1,380	1:2	1:2	1:2	92	65
Tpo ■	24.8	128–31,005	1:2	1:2	1:2	34	55
TRAIL R2/TNFRSF10B	2.2	20.6–5,000	1:2	1:2	1:2	74	44
TRAIL R3	1.7	53.1–12,900	1:2	1:2	1:2	97	74
TRANCE/RANK L/TNFSF11	4.7	51.2–12,450	1:2	1:2	1:2	78	48
ULBP-1 ■	6.4	76.1–18,500	1:2	1:2	1:2	6	18
ULBP-2/5/6 ■	62.3	259–63,000	1:2	1:2	1:2	8	20
ULBP-3 ■	8.4	91.8–22,300	1:2	1:2	1:2	10	22
ULBP-4/RAET1E ■	26	124–30,000	1:2	1:2	1:2	12	26
uPAR ■	43.2	248–60,300	1:2	1:2	1:2	7	19
Uteroglobin ■	5.4	41.2–10,000	1:2	1:50	1:50	40	65
VAP-1 ■	5.4	77.0–18,700	1:2	1:50	1:50	72	42
VCAM-1 ■	238	13,016–3,162,958	1:2	1:2	1:2	36	57
VEGF	2.1	15.9–3,853	1:2	1:2	1:2	11	26
VEGF-C	5.5	27.6–6,700	1:2	1:2	1:2	22	38
VEGF R3 ■	2.7	95.1–23,100	1:2	1:2	1:2	87	57
vWF-A2	11.9	70.0–17,000	1:2	1:2	1:2	5	15

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Screening Assays

Mouse Screening Analytes Available

■ Analyte available exclusively from R&D Systems

Analyte	Sensitivity (Mean Minimum Detectible Dose; pg/mL)	Standard Curve Range* (pg/mL)	Starting Sample Dilution		Bead Region	
			Cell Culture Supernates	Serum/ Plasma	Polystyrene	Magnetic
BAFF/BLyS/TNFSF13B	11	85.7–20,818	1:2	1:2	37	57
C1q R1/CD93 ■	76	520.126,350	1:2	1:2	42	64
CCL2/JE/MCP-1	134	337–81,802	1:2	1:2	5	18
CCL3/MIP-1α	0	11.1–2,692	1:2	1:2	27	46
CCL4/MIP-1β	77	414–33,525	1:2	1:2	31	51
CCL5/RANTES	19	78.8–19,138	1:2	1:2	21	38
CCL20/MIP-3α	40	134–32,660	1:2	1:2	29	48
CRP	261	921–223,850	1:2	1:2		63
CXCL1/KC	33	51.3–12,463	1:2	1:2	2	13
CXCL2/MIP-2	2	5.8–1,403	1:2	1:2	7	20
CXCL10/IP-10/CRG-2	7	177–42,908	1:2	1:2	20	37
CXCL12/SDF-1α ■	19	362–88,073	1:2	1:2	34	54
Epo	25	93.8–22,783	1:2	1:2	32	52
FGF-21 ■	225	112–27,190	1:2	1:2	38	61
FGF basic	41	78.3–6,340	1:2	1:2	43	65
G-CSF	1	46.6–11,330	1:2	1:2	22	39
GM-CSF	2	18.9–4,595	1:2	1:2	1	12
IFN-γ	2	25.9–6,294	1:2	1:2	16	33
IGF-I	3	36.1–8,783	1:50	1:2	35	55
IL-1α	8	53.4–12,983	1:2	1:2	28	47
IL-1β	42	345–83,778	1:2	1:2	6	19
IL-2	9	9.9–2,404	1:2	1:2	9	22
IL-4	53	70.9–17,223	1:2	1:2	10	25
IL-5	0	11.0–2,669	1:2	1:2	11	26
IL-6	2	65.8–15,983	1:2	1:2	12	27
IL-10	8	27.2–6,615	1:2	1:2	13	28
IL-12 p70	13	58.0–14,090	1:2	1:2	4	15
IL-13	246	416–101,025	1:2	1:2	14	29
IL-17A	7	164–39848	1:2	1:2	15	30
IL-23 p19	48	114–27743	1:2	1:2	23	42
IL-33	57	60.2–14638	1:2	1:2	24	43
Leptin	13	104–25,180	1:2	1:2	18	35
Lipocalin-2/NGAL	66	145–35,270	1:50	1:2	25	44
LIX ■	374	510–123,975	1:2	1:2	40	66
M-CSF	0	10.0–2,432	1:2	1:2	26	45
MMP-9	47	135–32,858	1:50	1:2	39	62
Osteopontin ■	2	35.9–8,728	1:50	1:2	36	56
Proprotein Convertase 9/ PCSK9 ■	289	78.8–19,138	1:2	1:2	33	53
Resistin	1	8.5–2,076	1:50	1:2	19	36
TNF-α	1	2.3–548	1:2	1:2	3	14
VEGF	4	15.4–3,753	1:2	1:2	8	21

*A standard curve must be generated each time an assay is run utilizing values from the Certificate of Analysis provided with each Luminex Screening Assay.

Screening Assays

For research use only. Not for use in diagnostic procedures.

Rat Screening Analytes Available

■ Analyte available exclusively from R&D Systems

| Analyte | Sensitivity (Mean Minimum Detectible Dose; pg/mL) | Standard Curve Range* (pg/mL) | Starting Sample Dilution | | | | Bead Region | |
			Cell Culture Supernates	Serum	EDTA Plasma	Heparin Plasma	Polystyrene	Magnetic
CXCL2/CINC-3 ■	10.4	124-30,100	None	1:2	1:2	1:2	54	12
CXCL3/CINC-2 α/β ■	3.10	43.0-10,400	None	1:2	1:2	1:2	53	13
GM-CSF	7.91	81-19,800	None	1:4	1:2	1:4	17	14
ICAM-1/CD54	7.52	101-24,600	None	1:4	1:4	1:4	75	15
IFN-γ	70.5	561-136,400	None	1:2	1:2	1:2	80	18
IL-1α/IL-1F1	13.0	292-71,000	None	1:4	1:2	1:4	6	19
IL-1β/IL-1F2	26.7	99.0-24,000	None	1:2	1:4	1:2	21	20
IL-2	45.9	226-54,800	None	1:4	1:4	1:4	61	21
IL-4	5.41	43.0-10,500	None	1:4	1:2	1:4	19	22
IL-6	56.0	1,070-260,000	None	1:2	1:2	1:2	10	25
IL-10	18.6	70.0-17,000	None	1:2	1:2	1:2	26	26
IL-13	6.08	67.0-16,200	None	1:4	1:4	1:4	74	27
IL-18	8.89	44.0-10,700	None	1:2	1:2	1:2	18	28
L–Selectin/CD62L ■	33.6	611-148,400	None	1:4	1:4	1:4	34	29
TIMP-1	5.38	319-77,600	None	1:4	1:4	1:4	33	30
TNF-α	22.1	474-115,200	None	1:2	1:2	1:2	4	33
VEGF	4.28	58.0-14,000	None	1:4	1:2	N/R	58	34

*A standard curve must be generated each time an assay is run utilizing values from the Certificate of Analysis provided with each Luminex Screening Assay.

Screening Assays

Luminex Performance Assays

Luminex Performance Assays are our most accurate and precise bead-based multianalyte profiling kits. Performance Assays are designed for researchers quantitating a defined set of analytes and needing the highest multiplex assay performance for select analytes with regard to recovery, linearity, and lot-to-lot reproducibility. In-house testing indicates that analyte concentrations determined with our Luminex Performance Assays correlate closely with those obtained with our Quantikine ELISAs (Figure 9). Performance Assays are fully validated for each sample type listed. The assays rely on diluents optimized for each panel, providing maximum performance for measuring the specific analytes in that panel. Analyte-specific reagents are available either as a complete panel or as a smaller subset from any panel. The kits can be used to measure target analytes in their validated sample types, which can include cell culture supernatants, serum, plasma, urine, saliva, and milk (Figure 10 on page 24).

Features

- **Optimized**: All analytes in a given panel are optimized and tested together to ensure maximum performance for the entire panel.
- **Validated**: Kits undergo validation testing similar to tests conducted on the Quantikine ELISA single analyte assays. The kits are correlated with Quantikine ELISAs, when available.
- **Flexible**: Order base kits and bead sets individually or as premixed kits.
- **Rapid**: Assay multiple analytes in 2.5–5 hours.
- **Efficient**: Measure multiple analytes in a small sample volume (≤ 100 µL).

Validation and Testing

Our Luminex Performance Assays undergo our most-extensive validation testing. All Luminex Performance Assay Panels are validated for use with plasma and serum samples. Some Performance Assays are additionally validated for cell culture supernatants, milk, saliva, or urine, as indicated on the individual product data sheets. Luminex Performance Assays are tested for sensitivity (three-quarters the low standard), intra-assay precision, inter-assay precision, and to ensure assay linearity for validated sample types. Recovery values for individual samples in validated sample types are also tested. Validation data for each analyte can be found in the product datasheet.

Formats

Analytes are available in polystyrene or magnetic bead formats.

- **Polystyrene beads:** Assays using polystyrene beads are compatible with the Luminex 100, Luminex 200, Luminex FLEXMAP 3D, Bio-Plex 200, or Bio-Plex 3D analyzers.
- **Magnetic beads:** Assays using magnetic beads are compatible with the Luminex MAGPIX, Luminex 100, Luminex 200, Luminex FLEXMAP 3D, Bio-Plex MAGPIX, Bio-Plex 200, or Bio-Plex 3D analyzers.

Kit Contents*

- **Base Kits:** Standard cocktail(s), microparticle diluent, biotin antibody diluent, calibrator diluent(s), Streptavidin-PE, wash buffer concentrate, mixing bottles, filter- or flat-bottom microplate, foil plate sealers
- **Bead Sets:** Antibody-coated microparticles, biotinylated detection antibodies

*Base Kits and Bead Sets can be ordered individually or as premixed kits.

Figure 9. Analyte Concentrations Determined Using the Luminex Performance Cardiac Panel A are Consistent with Corresponding Quantikine ELISA Results.
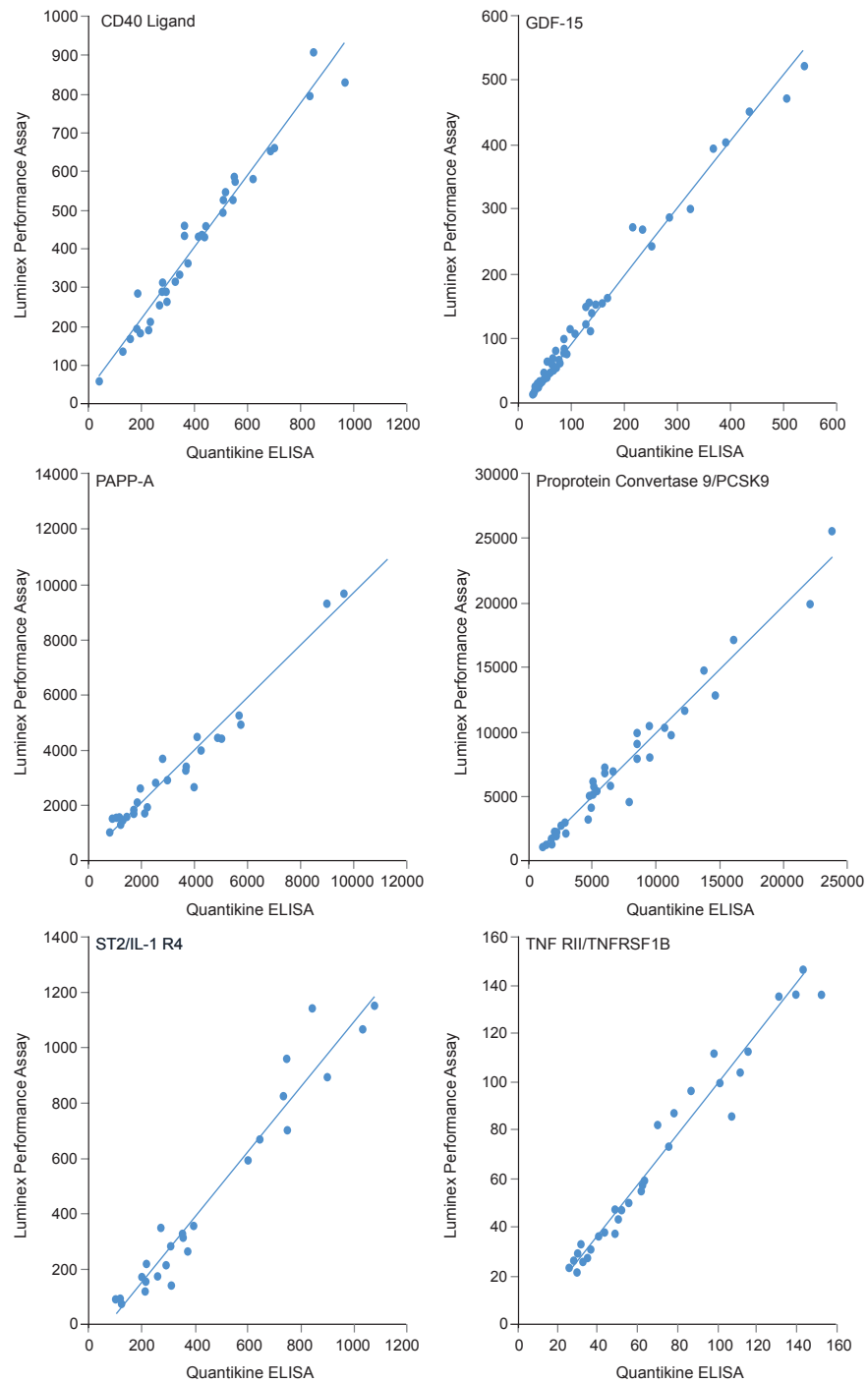
Serum samples were obtained from apparently healthy volunteers; no medical histories were available. Serum used to determine GDF-15 correlations were spiked with human HepG2 hepatocellular carcinoma cell culture supernatants to produce sample values across the dynamic range of the standard curve. Samples were simultaneously analyzed using the Luminex Performance Assay Cardiac Panel A (Catalog # LUCA000) and individually analyzed using the corresponding Quantikine ELISA kits. Quantikine ELISA kits used included the Human CD40 Ligand/TNFSF5 Quantikine ELISA Kit (Catalog # DCDL40), Human GDF-15 Quantikine ELISA Kit (Catalog # DGD150), Human Pappalysin-1/PAPP-A Quantikine ELISA Kit (Catalog # DPPA00), Human Proprotein Convertase 9/PCSK9 Quantikine ELISA Kit (Catalog # DPC900), Human ST2/IL-1 R4 Quantikine ELISA Kit (Catalog # DST200), and Human sTNF RII/TNFRSF1B Quantikine ELISA Kit (Catalog # DRT200). Analyte concentrations determined using each method were graphed. Analyte concentrations determined using the Luminex Performance Cardiac Panel A or corresponding Quantikine ELISAs are very closely correlated (Goodness of Fit R^2 > 0.95).

Figure 10. Luminex Performance Assay Measures Congestive Heart Failure-Related Molecules in Human Serum
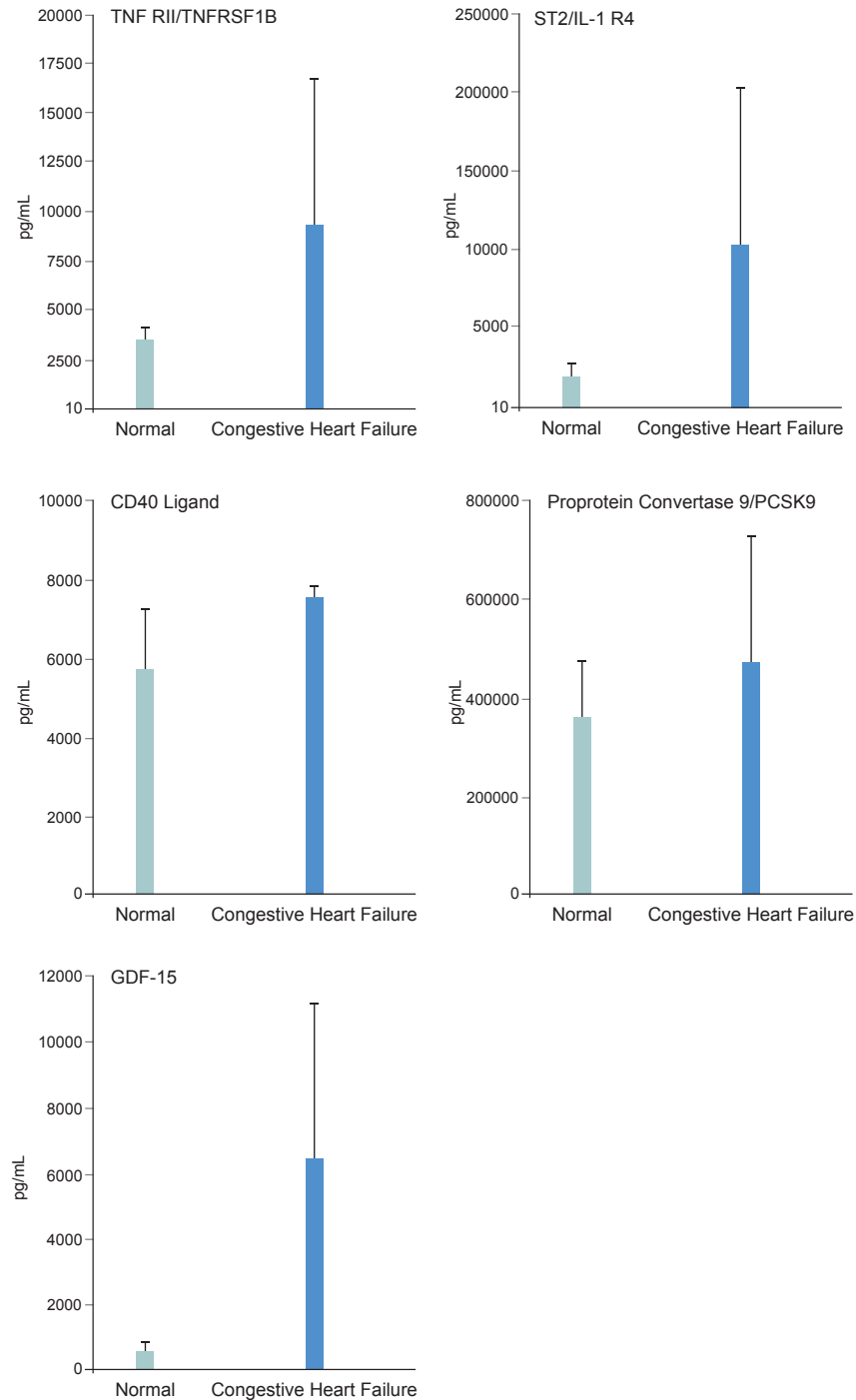
The Luminex Performance Human Cardiac Panel A was used to measure markers of heart failure in human serum samples. Samples collected from individuals with congestive heart failure were purchased (n = 10), and samples from apparently healthy individuals were collected in-house; no medical histories were available (n = 20). PAPP-A was not detectable in any of the samples analyzed.

Performance Assays

Performance Assays Available

Human Adhesion Molecule 4-plex*

Analyte	Catalog #	Sensitivity/MDD (pg/mL)	Standard Curve Range* (pg/mL)	Cell Culture Supernates	Serum, EDTA Plasma, Heparin Plasma	Polystyrene Microparticle Region
ICAM-1	LKT007	130	217–158,000	None	1:10	18
E-Selectin		2.1	72.3–52,700	None	1:10	39
P-Selectin		6.4	53.7–39,200	None	1:10	4
VCAM-1		252	1,095–798,700	None	1:10	35

* A standard curve must be generated each time an assay is run utilizing values from the Standard Value Card included in the kit.

Human Angiogenesis Panel*

■ Analyte available exclusively from R&D Systems

Analyte	Catalog # Polystyrene	Magnetic	Sensitivity/MDD (pg/mL)	Standard Curve Range* (pg/mL)
Human Angiogenesis Panel Base Kit	LAN000	LANM000	–	–
Angiogenin	LAN265	LANM265	1.4	2.81–11,500
Angiopoietin-1 ■	LAN923	LANM923	26.0	31.7–130,000
Endostatin ■	LAN1098	LANM1098	12.8	83.0–85,000
FGF acidic	LAN232	LANM232	2.6	5.81–23,800
FGF basic	LUH233	LANM233	1.82	34.0–8,700
PDGF-AA	LAN221	LANM221	0.4	1.39–5,710
PDGF-BB	LAN220	LANM220	0.5	5.15–21,100
PlGF	LAN264	LANM264	0.5	2.48–10,150
Thrombospondin-2	LAN1635	LANM1635	5.48	50.6–207,400
VEGF	LUH293	LANM293	0.81	2.34–9,600
VEGF-D	LAN622	LANM622	8.5	20.1–83,500

Analyte	Validated Samples and Recommended Starting Dilution					Microparticle Region	
	Cell Culture Supernates	Serum	EDTA Plasma, Platelet-poor EDTA Plasma, Heparin Plasma, Platelet-poor Heparin Plasma	Urine	Human Milk	Polystyrene	Magnetic
Human Angiogenesis Panel Base Kit	–	–	–	–	–	–	–
Angiogenin	1:5	1:5	1:50	1:5	1:20	5	12
Angiopoietin-1	1:5	1:5	1:5**	1:5	1:5	22	25
Endostatin	1:5	1:5	1:5	1:5	1:5	18	14
FGF acidic	1:5	1:5	1:5	1:5	1:5	33	15
FGF basic	1:5	1:5	1:5***	1:5	1:5	54	13
PDGF-AA	1:5	1:5	1:5**	1:5	1:5	51	18
PDGF-BB	1:5	1:5	1:5**	1:5	1:5	37	19
PlGF	1:5	1:5	1:5	1:5	1:5	34	20
Thrombospondin-2	1:5	1:5	1:5	1:5	1:5	59	21
VEGF	1:5	1:5	1:5	1:5	1:5	52	39
VEGF-D	1:5	1:5	1:5	1:5	1:5	66	22

* A standard curve must be generated each time an assay is run utilizing values from the Standard Value Card included in the Base Kit.
** Angiopoietin-1, PDGF-AA, and PDGF-BB are present in platelet granules and are released upon platelet activation. Therefore, to measure circulating levels of these factors, platelet-poor plasma should be collected for measurement.
*** Heparin plasma and platelet-poor heparin plasma are not suitable for use in the FGF basic assay.

Human Biomarker Panel A[*]

| Analyte | Catalog # | Sensitivity/ MDD (pg/mL) | Standard Curve Range* (pg/mL) | Validated Samples and Recommended Starting Dilution | | |
				Cell Culture Supernate	Serum, EDTA Plasma, Heparin Plasma	Polystyrene Microparticle Region
Human Biomarker Panel A Base Kit	LBA000	–	–	–	–	–
BAFF/BLyS/TNFSF13B	LBA124	0.56	3.14–2,290	1:2	1:3	13
CCL20/MIP-3α	LBA360	0.11	3.22–2,350	1:2	1:3	19
CD14 ■	LBA383	20.0	142–103,500	1:2	1:50	59
CD27/TNFRSF7 ■	LBA382	3.23	17.3–12,600	1:2	1:3	26
CXCL13/BLC/BCA-1	LBA801	0.56	2.83–2,060	1:2	1:3	22
gp130 ■	LBA228	12.0	113–82,500	1:2	1:50	60
IL-2 Rα	LBA223	0.45	9.30–6,780	1:2	1:3	32
IL-6 Rα	LBA227	1.01	15.4–11,200	1:2	1:50	79
TNF RII/TNFRSF1B	LUCA726	0.20	1.08–790	1:2	1:50	50

*A standard curve must be generated each time an assay is run utilizing values from the Standard Value Card included in the Base Kit.

Human Cardiac Panel A[*]

| Analyte | Catalog # | Sensitivity/ MDD (pg/mL) | Standard Curve Range* (pg/mL) | Validated Samples and Recommended Starting Dilution | |
				Serum, EDTA Plasma, Platelet-poor EDTA Plasma, Heparin Plasma, Platelet-poor Heparin Plasma	Polystyrene Microparticle Region
Human Cardiac Panel A Base Kit	LUCA000	–	–	–	–
CD40 Ligand	LUB201	7.58	51.2–37,300	1:10**	18
GDF-15	LUCA975	0.30	6.38–4,650	1:10	2
Pappalysin-1/PAPP-A	LUCA2487	79	653–476,000	1:10	13
Proprotein Convertase 9/ PCSK9 ■	LUCA3888	32	143–104,000	1:10	16
ST2/IL-1R4 ■	LUCA523	6.0	69.1–50,400	1:10	30
TNF RII	LUCA726	0.20	6.58–4,800	1:10	50

* A standard curve must be generated each time an assay is run utilizing values from the Standard Value Card included in the Base Kit.
**CD40 Ligand is present in platelet granules and is released upon platelet activation. Therefore, to measure circulating levels of CD40 Ligand, platelet-poor plasma should be collected for measurement.

Human Cardiac Panel B[*]

| Analyte | Catalog # | Sensitivity/MDD (pg/mL) | Standard Curve Range* (pg/mL) | Validated Samples and Recommended Starting Dilution | |
				Serum, EDTA Plasma, Platelet-poor EDTA Plasma, Heparin Plasma, Platelet-poor Heparin Plasma	Polystyrene Microparticle Region
Human Cardiac Panel B Base Kit	LUCB000	–	–	–	–
C-Reactive Protein	LUCB1707	14.7	184–134,000	1:100	4
Cystatin C	LUCB1196	41.6	412–300,000	1:100	8
Myeloperoxidase	LUCB3174	18.4	137–99,700	1:100**	12
P-Selectin	LUCB137	9.02	66.7–48,600	1:100	21
Serpin E1/PAI-1	LUCB1786	0.364	8.98–6,550	1:100	26
TIMP-1	LUCB970	1.59	16.0–11,700	1:100	37

* A standard curve must be generated each time an assay is run utilizing values from the Standard Value Card included in the Base Kit.
** Myeloperoxidase is present in neutrophil granules and is released upon neutrophil exposure to activated platelets. Therefore, to measure circulating levels of myeloperoxidase, platelet-poor plasma should be collected for measurement.

Performance Assays

For research use only. Not for use in diagnostic procedures.

Human Cytokine Panel A*

Analyte	Catalog #		Sensitivity/ MDD (pg/mL)	Standard Curve Range* (pg/mL)	Validated Samples and Recommended Starting Dilution		Microparticle Region	
	Polystyrene	Magnetic			Cell Culture Supernates	Serum, EDTA Plasma, Heparin Plasma	Polystyrene	Magnetic
Human Cytokine Panel A Base Kit	LUH000	LUHM000	–	–	–	–	–	–
CCL2/MCP-1	LUH279	LUHM279	0.16	3.36–2,450	None	1:4	78	33
CCL3/MIP-1α	LUH270	LUHM270	8.11	18.5–13,500	None	1:4**	59	34
CCL4/MIP-1β	LUH271	LUHM271	0.44	8.23–6,000	None	1:4	74	35
CCL5/RANTES	LUH278	LUHM278	1.08	3.43–2,500	None	1:4	80	36
CXCL8/IL-8	LUH208	LUHM208	0.39	3.91–2,850	None	1:4	36	28
CXCL5/ENA-78	LUH254	LUHM254	2.71	9.19–6,700	None	1:4	37	12
FGF basic	LUH233	LUHM233	1.82	19.3–4,700	None	1:4	54	13
G-CSF	LUH214	LUHM214	0.57	5.28–3,850	None	1:4	58	14
GM-CSF	LUH215C	LUHM215	1.55	10.9–2,650	None	1:4	11	15
IFN-γ	LUH285	LUHM285	0.31	3.02–2,200	None	1:4	75	18
IL-1α/IL-1F1	LUH200B	LUHM200	0.24	2.40–1,750	None	1:4	5	19
IL-1ra/IL-1F3	LUH280	LUHM280	4.05	23.7–5,750	None	1:4	16	21
IL-1β/IL-1F2	LUH201	LUHM201	0.27	2.81–2,050	None	1:4	6	20
IL-2	LUH202	LUHM202	0.89	2.88–2,100	None	1:4	17	22
IL-4	LUH204	LUHM204	1.75	13.0–3,150	None	1:4	21	25
IL-5	LUH205	LUHM205	0.33	1.92–1,400	None	1:4	9	26
IL-6	LUH206	LUHM206	0.36	5.56–4,050	None	1:4	32	27
IL-10	LUH217	LUHM217	0.13	3.09–2,250	None	1:4	50	29
IL-17	LUH317	LUHM317	0.39	3.09–2,250	None	1:100	20	30
TNF-α	LUH210	LUHM210	0.60	5.42–3,950	None	1:4	77	37
Thrombopoietin/ Tpo	LUH288	LUHM288	2.81	20.6–15,000	None	1:4	34	38
VEGF	LUH293	LUHM293	0.81	3.43–2,500	None	1:4	52	39

* A standard curve must be generated each time an assay is run utilizing values from the Standard Value Card included in the Base Kit.
** Heparin plasma is not recommended for use with the CCL3/MIP-1α assay.

Performance Assays

RnDSystems.com/LuminexPerformance

Human Cytokine Panel B*

Analyte	Catalog #	Sensitivity/MDD (pg/mL)	Standard Curve Range* (pg/mL)	Validated Samples and Recommended Starting Dilution		
				Cell Culture Supernates	Serum, EDTA Plasma, Heparin Plasma	Polystyrene Microparticle Region
Human Cytokine Panel B Base Kit	LUB000	–	–	–	–	–
CCL11/Eotaxin	LUB320	2.6	53.1–12,900**	None	1:4	22
CD40 Ligand	LUB201	7.58	11.52–8,400	None	1:4	18
CXCL10/IP-10	LUB266	0.06	3.84–2,800	1:15	1:4***	39
CXCL11/I-TAC	LUB672	2.1	24.4–17,800	None	1:4	60
EGF	LUB236	0.57	3.70–2,700	None	1:4	51
HGF	LUB294	2.1	33.7–24,600	None	1:4	53
IL-12 p70	LUB219	5.1	50.9–37,100	1:2	1:4	7
IL-13	LUB213	6.0	42.0–30,600	None	1:4	35
Leptin	LUB398	7.69	94.2–68,700	None	1:4	31

*A standard curve must be generated each time an assay is run utilizing values from the Standard Value Card included in the Base Kit.
** This is the standard curve range for Eotaxin when assaying serum and plasma samples. The standard curve range when assaying cell culture supernate samples is 17.7–12,900 pg/mL.
***Serum and EDTA Plasma are not recommended for use with the CXCL10/IP-10 assay.

Human HS Cytokine Panel A*

Analyte	Catalog #		Sensitivity/MDD (pg/mL)	Standard Curve Range* (pg/mL)	Serum, EDTA Plasma, Heparin Plasma	Microparticle Region	
	Polystyrene	Magnetic				Polystyrene	Magnetic
Human High Sensitivity Cytokine Panel A Base Kit	LHSC000	LHSCM000	–	–	–	–	–
CXCL8/IL-8	LHSC208	LHSCM208	0.04	0.756–3,100	1:2	36	26
GM-CSF	LHSC215	LHSCM215	0.07	0.392–1,600	1:2	11	29
IFN-γ	LHSC285	LHSCM285	0.04	0.273–1,490	1:2	75	30
IL-1β	LHSC201	LHSCM201	0.08	0.392–1,600	1:2	6	20
IL-2	LHSC202	LHSCM202	0.13	0.612–2,500	1:2	17	19
IL-4	LHSC204	LHSCM204	1.14	6.84–7,000	1:2	21	21
IL-5	LHSC205	LHSCM205	0.06	0.392–1,600	1:2	9	22
IL-6	LHSC206	LHSCM206	0.14	1.0–4,100	1:2	32	25
IL-10	LHSC217	LHSCM217	0.10	0.512–2,100	1:2	50	27
IL-12 p70	LHSC219	LHSCM219	1.81	6.36–26,000	1:2	7	28
TNF-α	LHSC210	LHSCM210	0.29	0.904–3,700	1:2	77	12
VEGF	LHSC293	LHSCM293	0.88	2.05–2,100	1:2	52	13

*A standard curve must be generated each time an assay is run utilizing values from the Standard Value Card included in the Base Kit.

For research use only. Not for use in diagnostic procedures.

Human HS Cytokine Panel B*

■ Analyte available exclusively from R&D Systems

Analyte	Catalog #	Sensitivity/MDD (pg/mL)	Standard Curve Range* (pg/mL)	Cell Culture Supernates	Serum, EDTA Plasma, Heparin Plasma	Magnetic Microparticle Region
Human High Sensitivity Cytokine Panel B Base Kit	LBHS000	–	–	–	–	–
GM-CSF	LHSCM215	0.155	1.6–6,550	None	1:2	29
IFN-γ	LHSCM285	0.04	0.064–260	None	1:2	30
IL-1β/IL-1F2	LHSCM201	0.08	1.04–4,240	None	1:2	20
IL-2	LHSCM202	0.13	1.18–4,850	None	1:2	19
IL-5	LHSCM205	0.06	0.513–2,100	None	1:2	22
IL-6	LHSCM206	0.14	0.647–2,650	None	1:2	25
IL-7	LBHS207	0.078	0.828–3,390	None	1:2	33
IL-10	LHSCM217	0.211	1.07–4,400	None	1:2	27
IL-13	LBHS213	0.983	6.25–25,600	None	1:2	34
IL-15	LBHS247	0.065	0.591–2,420	None	1:2	35
IL-17A	LBHS317	0.156	2.53–10,370	None	1:2	36
IL-17F	LBHS1335	1.52	8.97–36,750	None	1:2	37
IL-22	LBHS5782	0.269	1.64–6,700	None	1:2	38
IL-23	LBHS1716	3.10	17.09–70,000	None	1:2	39
IL-31	LBHS2824	0.433	5.13–21,100	None	1:2	42
IL-33	LBHS3625	0.193	2.44–10,000	None	1:2	18
IL-36β ■	LBHS1099	0.092	0.527–2,160	None	1:2	15
TNF-α	LHSCM210	0.29	1.20–4,920	None	1:2	12

*A standard curve must be generated each time an assay is run utilizing values from the Standard Value Card included in the Base Kit.

Human Kidney Biomarkers Panel*

■ Analyte available exclusively from R&D Systems

Analyte	Catalog #	Sensitivity/MDD (pg/mL)	Standard Curve Range* (pg/mL)	Validated Samples and Recommended Starting Dilution		Magnetic Microparticle Region
				Serum, EDTA Plasma, Heparin Plasma	Urine	
Human Kidney Biomarker Panel Base Kit	LHK000	–	–	–	–	–
Clusterin	LHK2937	47.0	670–488,100	1:4,000	1:10	20
Cystatin C	LHK1196	16.6	72–17,600	1:4,000	1:10	19
CXCL10/IP-10	LHK266	0.321	3.70–2,700	1:10	1:10	25
Fetuin A/AHSG	LHK1184	310	3,498–2,550,000	1:4,000	1:10	21
Lipocalin-2/NGAL	LHK1757	35.3	50.1–36,800	1:10	1:10	27
Osteopontin (OPN)	LHK1433	133	338–246,200	1:10	1:10	28
RBP4 ■	LHK3378	47.5	65.0–47,400	1:4,000	1:10	29
TFF3	LHK4407	1.27	16.0–11,700	1:10	1:10	30
TIM-1/KIM-1/HAVCR	LHK1750	7.5	162–117,800	1:10	1:10	26

*A standard curve must be generated each time an assay is run utilizing values from the Standard Value Card included in the Base Kit.

Performance Assays

Human MMP Panel*

	Catalog #			
Analyte	Polystyrene	Magnetic	Sensitivity/MDD (pg/mL)	Standard Curve Range* (pg/mL)
Human MMP Panel Base Kit	LMP000B	LMPM000	–	–
EMMPRIN ■	LMP972	LMPM972	2.3	35.3–25,700
MMP-1	LMP901B	LMPM901	0.57	25.1–18,300
MMP-2	LMP902C	LMPM902	3.8	86.6–63,100
MMP-3	LMP513B	LMPM513	1.8	35.2–25,700
MMP-7	LMP907B	LMPM907	3.9	76.6–55,850
MMP-8	LMP908B	LMPM908	7.8	81.9–59,700
MMP-9	LMP911B	LMPM911	5.7	100–73,100
MMP-10	LMP910	LMPM910	1.7	42.5–31,000
MMP-12	LMP919B	LMPM919	0.5	9.19–6,700
MMP-13	LMP511B	LMPM511	36.5	444–324,000

	Validated Samples and Recommended Starting Dilution				Microparticle Region	
Analyte	Cell Culture Supernate	Serum, Heparin Plasma, Platelet-poor Heparin Plasma	Saliva	Urine	Polystyrene	Magnetic
Human MMP Panel Base Kit	–	–	–	–	–	–
EMMPRIN	1:5	1:5**	1:40	1:10	75	30
MMP-1	1:5	1:5	1:40	1:10	4	20
MMP-2	N/R	1:50	1:40	1:10	13	19
MMP-3	1:5	1:5	1:40	1:10	26	21
MMP-7	1:5	1:5	1:40	1:10	30	22
MMP-8	1:5	1:50	1:40	1:10	43	25
MMP-9	1:5	1:50***	1:40	1:10	47	26
MMP-10	1:5	1:5	1:40	1:10	54	27
MMP-12	1:5	1:50	1:40	1:10	62	28
MMP-13	1:5	1:5****	1:40	1:10	66	29

*A standard curve must be generated each time an assay is run utilizing values from the Standard Value Card included in the Base Kit.
**When assaying serum and plasma samples, EMMPRIN cannot be multiplexed with MMP-7, MMP-8, MMP-10, MMP-12, or MMP-13
***MMP-9 is present in platelet granules and released upon platelet activation. Therefore, to measure circulating levels of this factor, platelet-free plasma should be collected for measurement.
****Heparin plasma and platelet-poor heparin plasma are not recommended for use with the MMP-13 assay.
N/R=This sample type is not recommended for use in this assay

Human Obesity Panel*

				Validated Samples and Recommended Starting Dilution		
Analyte	Catalog #	Sensitivity/MDD (pg/mL)	Standard Curve Range* (pg/mL)	Cell Culture Supernates	Serum, EDTA Plasma, Heparin Plasma	Polystyrene Microparticle Region
Human Obesity Panel Base Kit	LOB000	–	–	–	–	–
Adiponectin/Acrp30	LOB1065	6.4	348–253,800	None	1:100	2
C-Reactive Protein	LOB1707	1.4	36.0–26,300	None	1:100	8
CCL2/MCP-1	LUH279	0.16	3.63–2,650	None	1:4	78
Complement Factor D/ Adipsin	LOB1824	1.8	123–89,600	None	1:100	11
IL-6	LUH206	0.36	7.2–5,240	None	1:4	32
IL-10	LUH217	0.13	3.09–2,250	None	1:4	50
Leptin	LUB398	7.69	52.8–38,400	None	1:4	31
Resistin	LOB1359	0.85	48.3–35,300	None	1:4	12
Serpin E1/ PAI-1	LOB1786	0.20	15.09–11,000	None	1:100	10
TNF-α	LUH210	0.60	7.65–5,570	None	1:4	77

*A standard curve must be generated each time an assay is run utilizing values from the Standard Value Card included in the Base Kit.

Performance Assays

Human TIMP 4-plex*

	Catalog #									Microparticle Region	
Analyte	Polystyrene	Magnetic	Sensitivity/ MDD (pg/mL)	Standard Curve Range* (pg/ mL)	Cell Culture Supernates	Serum, EDTA Plasma, Heparin Plasma	Urine	Saliva	Human Milk	Polystyrene	Magnetic
TIMP-1	LKT003	LKTM003	1.54	13.6–9,900	1:10	1:50	1:5	1:100	1:200	9	12
TIMP-2			14.7	42.6–31,000	1:10	1:50	1:5	1:100	1:200	33	13
TIMP-3			86	133–97,000	1:10	1:50	1:5	1:100	1:200	34	14
TIMP-4			1.29	6.87–5,000	1:10	1:50	1:5	1:100	1:200	74	15

*A standard curve must be generated each time an assay is run utilizing values from the Standard Value Card included in the kit.

Rat Kidney Toxicity Panel*

				Validated Samples and Recommended Starting Dilution	
Analyte	Catalog #	Sensitivity/MDD (pg/mL)	Standard Curve Range* (pg/mL)	Serum, EDTA Plasma, Urine	Polystyrene Microparticle Region
Rat Kidney Toxicity Base Kit	LRK000	–	–	–	–
Cystatin C	LRK6154	2.4	27.2–19,800	1:200	35
FABP1/L-FABP	LRK1565	72	2,469–1,800,000	1:4	31
Lipocalin-2/NGAL	LRK3508	2.6	7.61–5,550	1:200	12
TIM-1/KIM-1/HAVCR	LRK3689	1.5	15.0–10,900	1:4	25
Osteopontin/OPN	LRK6359	0.6	11.2–8,150	1:200	51

*A standard curve must be generated each time an assay is run utilizing values from the Standard Value Card included in the Base Kit.

TGF-β 3-plex*

Analyte	Catalog #	Sensitivity/MDD (pg/mL)	Standard Curve Range* (pg/mL)	Cell Culture Supernates	Serum, Platelet-poor EDTA Plasma, Urine, Human Milk	Polystyrene Microparticle Region
TGF-β1	LKT001	11.1	36.6–26,700	1:5	1:15	78
TGF-β2		6.8	17.7–12,900	1:5	1:15	33
TGF-β3		14.3	62.4–45,400	1:5	1:15	6

*A standard curve must be generated each time an assay is run utilizing values from the Standard Value Card included in the kit.

Choose Your Luminex Assay Format

R&D Systems offers Luminex Assays in two formats, the Luminex Screening Assay and the Luminex Performance Assay. The Screening Assay is optimized to simultaneously analyze a wide variety and large number of analytes, while the Performance Assays, our most optimized assays, are validated in smaller analyte panels. Use the side-by-side comparison table below to determine which Luminex Assay format is right for you.

Feature		Screening	Performance
Species Available	Human	✓	✓
	Mouse	✓	
	Rat	✓	
Sample Volume Required	µL Sample	≤ 50	≤ 100
Multiplex Analyte Capacity	Polystyrene	100 User-Selected	User-Selected from Panel
	Magnetic	50 User-Selected	User-Selected from Panel
Bead Type	Polystyrene	✓	✓
	Magnetic	✓	✓
Validated Sample Types	Serum	✓	✓
	Plasma	✓	✓
	Cell Culture Supernates	✓	See Datasheet*
	Milk		See Datasheet*
	Saliva		See Datasheet*
	Urine		See Datasheet*
Run Time	Hours	3–3.5	2.5–5
Kit Preparation	Premixed	✓	✓
	End-user Mixed		✓
Assay Validation	Mean Sensitivity	< the low standard**	≤ 3/4 the low standard
	Intra-assay Precision	< 20%	< 15%
	Inter-assay Precision	< 25%	< 17%
	Recovery (Individual Samples)		70–130%
	Assay Linearity	Dose-Dependent Decrease in Values	1:2–1:8
	Linearity (Individual Samples)	Dose-Dependent Decrease in Values	70–130%

*Visit RnDSystems.com/LuminexPerformance
**Visit RnDSystems.com/LuminexScreening for mean sensitivity values for each analyte

Ordering

For research use only. Not for use in diagnostic procedures.

Ordering Your Luminex Assay

The R&D Systems Luminex Assay Online Ordering Tool is designed to help you choose the right Luminex Assay for your unique research needs.

The ordering tool directs you step-by-step through the selection of:

1. Assay type (Performance or Screening)

2. Bead type (polystyrene or magnetic)

3. Species options (human, mouse, rat)

4. Available analytes*

*Information concerning analytes with potential assay cross-reactivity or overlapping bead regions are noted within the ordering tool to facilitate the selection of optimized user-defined multiplex assays.

Additional Features

The R&D Systems Luminex Assay Online Ordering Tool includes these additional features to facilitate ordering:

• Saving and retrieving your selected Luminex Assay configuration makes re-ordering quick and easy

• View how the selection of each assay specification changes the final kit options

• Find pricing options for premixed or end-user mixed Performance Assays

• Easy navigation within the tool allows you to alter your assay selections at any time

• Access to ordering or technical support from representatives via phone and email

> ### Access the Luminex Assay Online Ordering Tool at
> ### RnDSystems.com/Luminex