bio-techne

R&D SYSTEMS

Luminex® Performance Assay

Human Chemokine Fixed Panel

Catalog Number LKTM012B

For the simultaneous quantitative determination of multiple human chemokine concentrations in cell culture supernates, serum, plasma, and platelet-poor plasma.

This package insert must be read in its entirety before using this product.
For research use only. Not for use in diagnostic procedures.

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INTRODUCTION

Analyzing the expression profile of chemokines is essential for understanding their roles in regulating migration of monocytes, neutrophils, and lymphocytes. Chemokine research plays a key role in greater understanding of the immune system and its multi-faceted response to antigens, as well as understanding disease states like cancer, inflammatory disease and allergic reactions.

Assessing the levels of multiple chemokines may be more revealing than analyzing a single protein. Quantifying multiple chemokines on an individual level using enzyme-linked immunosorbent assays (ELISA), for example, can be time consuming and expensive. Multiplex assays allow measurement of multiple chemokines simultaneously and conserves precious samples by using a small sample volume.

The Chemokine Performance Assay is a multiplex Luminex® bead-based assay that allows for rapid, sensitive, and economical profiling of chemokines associated with the regulation of immune cells. Luminex® High Performance Assays from R&D Systems® are rigorously validated to maximize assay accuracy, precision, and reproducibility. For ease of use, the microparticles are premixed.

Analyte	Microparticle Region
Eotaxin	13
GROα	27
IL-8	30
IP-10	28
MCP-1	15
MIP-1α	20
MIP-1β	21
RANTES	72

PRINCIPLE OF THE ASSAY

Luminex® Performance Assay multiplex kits are designed for use with any Luminex analyzer including the MAGPIX®, Luminex® 100/200™, FLEXMAP 3D®, xMAP INTELLIFLEX®, or Bio-Rad® Bio-Plex®, dual laser, flow-based sorting and detection platforms.

Analyte-specific antibodies are pre-coated onto magnetic microparticles embedded with fluorophores at set ratios for each unique microparticle region. Microparticles, standards and samples are pipetted into wells and the immobilized antibodies bind the analytes of interest. After washing away any unbound substances, a biotinylated antibody cocktail specific to the analytes of interest is added to each well. Following a wash to remove any unbound biotinylated antibody, streptavidin-phycoerythrin conjugate (Streptavidin-PE), which binds to the biotinylated antibody, is added to each well. Final washes remove unbound Streptavidin-PE, the microparticles are resuspended in buffer and read using the MAGPIX®. A magnet in the analyzer captures and holds the superparamagnetic microparticles in a monolayer. Two spectrally distinct Light Emitting Diodes (LEDs) illuminate the microparticles. One LED excites the dyes inside each microparticle to identify the region and the second LED excites the PE to measure the amount of analyte bound to the microparticle. A sample from each well is imaged with a CCD camera with a set of filters to differentiate excitation levels.

Analysis with the Luminex® 100/200™, FLEXMAP 3D®, xMAP INTELLIFLEX®, or Bio-Rad® Bio-Plex® uses one laser to excite the dyes inside each microparticle to identify the microparticle region and the second laser to excite the PE to measure the amount of analyte bound to the microparticle. All excitation emitted as each microparticle passes through the flow cell is then analyzed to differentiate excitation levels using a Photomultiplier Tube (PMT) and an Avalanche Photodiode.

LIMITATIONS OF THE PROCEDURE

- FOR RESEARCH USE ONLY. NOT FOR USE IN DIAGNOSTIC PROCEDURES.
- The kit should not be used beyond the expiration date on the kit label.
- Do not mix or substitute reagents with those from other lots or sources.
- If samples fall outside the dynamic range of the assay, further dilute the samples with the appropriate calibrator diluent and repeat the assay.
- Any variation in diluent, operator, pipetting technique, washing technique, incubation time or temperature, and kit age can cause variation in binding.
- Variations in sample collection, processing, and storage may cause sample value differences.
- This assay is designed to eliminate interference by other factors present in biological samples. Until these factors have been tested in the Luminex® Performance Assay, the possibility of interference cannot be excluded.
- Luminex® Performance Assays afford the user the benefit of multi-analyte analysis of biomarkers in a single complex sample. For each sample type, a single multipurpose diluent is used to optimize recovery, linearity, and reproducibility. Such a multipurpose diluent may not optimize any single analyte to the same degree that a unique diluent selected for analysis of that analyte can optimize conditions, therefore, some performance characteristics may be more variable than those for assays designed specifically for single analyte analysis.
- **Only the analytes listed on the Standard Value Card can be measured with this kit.**

MATERIALS PROVIDED & STORAGE CONDITIONS

Store the unopened kit at 2-8 °C. Do not use past the kit expiration date.

PART	PART #	DESCRIPTION	STORAGE OF OPENED, DILUTED, OR RECONSTITUTED MATERIAL
Standard Cocktail 1	899476	2 vials of recombinant human cytokines in a buffered protein base with preservatives; lyophilized.	Discard after use. Use a fresh standard and control for each assay.
Standard Cocktail 2	899477		
Human Performance Panel Low Control	899333	2 vials of recombinant human cytokines in a buffered protein base with preservatives; lyophilized.	
Human Performance Panel High Control	899334		
Human Chemokine Microparticle Cocktail	898974	0.600 mL of a concentrated microparticle cocktail with preservative.	May be stored for up to 1 month at 2-8 °C.* *Once diluted, 1X solutions must be discarded. Use fresh diluents for each assay.*
Human RANTES Magnetic Microparticles	898840	0.075 mL a concentrated microparticle stock with preservatives.	
Human Performance Panel Biotin-Antibody Cocktail	899335	1 vial of a concentrated biotinylated antibody cocktail; lyophilized.	
Streptavidin-PE	896978	0.250 mL of a concentrated streptavidin-phycoerythrin conjugate with preservatives.	
Microparticle Diluent	896976	6 mL of a buffered protein base with blue dye and preservative.	May be stored for up to 1 month at 2-8 °C.*
Biotin Antibody Diluent 2	896977	8 mL of a buffered protein base with preservative.	
Calibrator Diluent RD6-65	896975	21 mL of a buffered protein base with preservatives. *Use diluted 1:2 for cell culture supernate samples. Use undiluted for serum/plasma/platelet-poor plasma samples.*	
Wash Buffer Concentrate	895003	21 mL of a 25-fold concentrated solution of buffered surfactant with preservative. *May turn yellow over time.*	
Microplate	641385	1 flat-bottomed 96-well microplate used as a vessel for the assay.	
Mixing Bottles	895505	2 empty 8 mL bottles used for mixing microparticles with Microparticle Diluent.	
Plate Sealers	640445	4 adhesive foil strips.	
Standard Value Card	700174	1 card listing the standard reconstitution volume and working standard concentrations for this lot of base kit.	
Control Mean Value Card	700175	1 card listing the low and high mean control values.	

*Provided this is within the expiration date of the kit.

Additional wash buffer (#WA126) and plates (#LYX010) are available for purchase.

OTHER SUPPLIES REQUIRED

- **Luminex® Performance Assay analyte-specific kit(s) (see page 1)**
- MAGPIX®, Luminex® 100/200™, FLEXMAP 3D®, xMAP INTELLIFLEX®, or Bio-Rad® Bio-Plex® analyzer with X-Y platform
- Hand-held microplate magnet or platewasher with a magnetic platform
- Pipettes and pipette tips
- Deionized or distilled water
- Multi-channel pipette, manifold dispenser, or automated dispensing unit
- 50 mL and 500 mL graduated cylinders
- Horizontal orbital microplate shaker (0.12" orbit) capable of maintaining a speed of 800 ± 50 rpm
- Microcentrifuge
- **Polypropylene** test tubes for dilution of standards and samples

PRECAUTIONS

Some components in this kit contain a preservative which may cause an allergic skin reaction. Avoid breathing mist.

Wear protective gloves, clothing, eye, and face protection. Wash hands thoroughly after handling. Refer to the SDS on our website prior to use.

TECHNICAL HINTS

- When mixing or reconstituting protein solutions, always avoid foaming.
- To avoid cross-contamination, change pipette tips between additions of each standard level, between sample additions, and between reagent additions. Also, use separate reservoirs for each reagent.
- To ensure accurate results, proper adhesion of plate sealers during incubation steps is necessary.
- Protect microparticles and Streptavidin-PE from light at all times to prevent photobleaching.

SAMPLE COLLECTION AND STORAGE

The sample collection and storage conditions listed below are intended as general guidelines. Sample stability has not been evaluated.

Cell Culture Supernates - Remove particulates by centrifugation and assay immediately or aliquot and store samples at ≤ -20 °C. Avoid repeated freeze-thaw cycles.

Serum - Use a serum separator tube (SST) and allow samples to clot for 30 minutes at room temperature before centrifuging for 15 minutes at 1000 x g. Remove serum and assay immediately or aliquot and store samples at ≤ -20 °C. Avoid repeated freeze-thaw cycles.

Plasma - Collect plasma using EDTA or heparin as an anticoagulant. Centrifuge for 15 minutes at 1000 x g within 30 minutes of collection. Assay immediately or aliquot and store samples at ≤ -20 °C. Avoid repeated freeze-thaw cycles.

Platelet-poor Plasma - Collect plasma on ice using EDTA or heparin as an anticoagulant. Centrifuge at 2-8 °C for 15 minutes at 1000 x g within 30 minutes of collection. For more complete platelet removal, an additional centrifugation step of the separated plasma at 1500 x g for 10 minutes at 2-8 °C is recommended. Assay immediately or aliquot and store samples at ≤ -20 °C. Avoid repeated freeze-thaw cycles.

Note: *Citrate plasma is not validated for use in this assay.*
Hemolyzed, icteric, and lipemic samples are not suitable for use in this assay.
Heparin plasma and platelet-poor plasma samples are not suitable for use in the Eotaxin assay.

Some chemokines may be released upon platelet activation. For example, to measure circulating levels of GROα and RANTES, platelet-poor plasma should be used. It should be noted that many protocols for plasma preparation, including procedures recommended by the Clinical and Laboratory Standards Institute (CLSI), result in incomplete removal of platelets or platelet activation. This may cause variable and irreproducible results for assays of factors contained in platelets and released by platelet activation.

SAMPLE PREPARATION

Use polypropylene tubes.

Note: *On the day of the assay, ALL fresh and previously frozen serum and plasma samples require centrifugation at 16,000 x g for 4 minutes immediately prior to use or dilution.*

Cell culture supernate samples require a 2-fold dilution. A suggested 2-fold dilution is 75 µL of sample + 75 µL of Calibrator Diluent RD6-65 (diluted 1:2)*. Mix thoroughly.

Serum, plasma, and platelet-poor plasma samples require a 2-fold dilution. A suggested 2-fold dilution is 75 µL of sample + 75 µL of Calibrator Diluent RD6-65. Mix thoroughly.

*See Reagent Preparation section.

REAGENT PREPARATION

Bring all reagents to room temperature before use.

Wash Buffer - If crystals have formed in the concentrate, warm to room temperature and mix gently until the crystals have completely dissolved. Add 20 mL of Wash Buffer Concentrate to 480 mL of deionized or distilled water to prepare 500 mL of Wash Buffer.

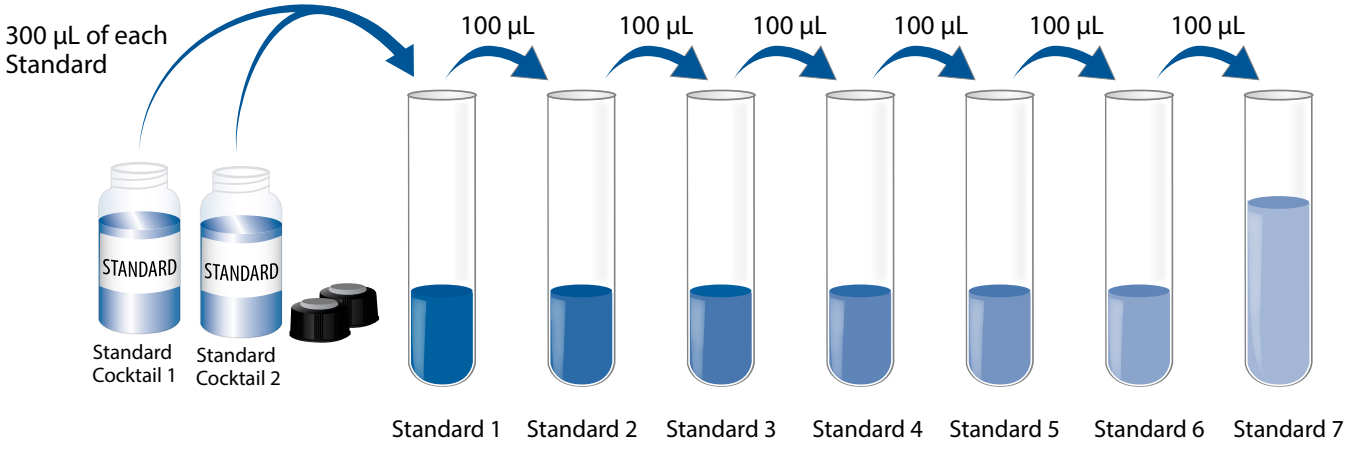
Calibrator Diluent RD6-65 (diluted 1:2) - **For cell culture supernate samples only.** Add 10 mL of Calibrator Diluent RD6-65 to 10 mL of deionized or distilled water to prepare 20 mL of Calibrator Diluent RD6-65 (diluted 1:2).

Low and High Kit Controls - **Refer to the vial label for reconstitution volume.** Reconstitute the low and high controls with Calibrator Diluent RD6-65 (diluted 1:2) (*for cell culture supernate samples*) or Calibrator RD6-65 (*for serum/plasma/platelet-poor plasma samples*). Allow the controls to sit for a minimum of 15 minutes with gentle agitation prior to plating.

Biotin-Antibody Cocktail - **Refer to the vial label for reconstitution volume.** Reconstitute the Biotin-Antibody Cocktail with Biotin Antibody Diluent 2. Allow the antibody cocktail to sit for a minimum of 20 minutes or a minimum of 5 minutes on a nutator.

Standard - **Refer to the Standard Value Card for the reconstitution volume and assigned values.** Reconstitute the Standard 1 and Standard 2 with Calibrator Diluent RD6-65 (diluted 1:2) (*for cell culture supernate samples*) or Calibrator RD6-65 (*for serum/plasma/platelet-poor plasma samples*). Allow the standards to sit for a minimum of 20 minutes prior to combining and making dilutions.
Note: *Do NOT vortex standard cocktail. Gentle agitation should be initiated only after the 20-minute reconstitution step is complete.*

Use polypropylene tubes. Create Standard 1 by combining 300 µL of each standard cocktail into the Standard 1 Tube. Pipette 200 µL of Calibrator Diluent RD6-65 (diluted 1:2) (*for cell culture supernate samples*) or Calibrator Diluent RD6-65 (*for serum/plasma/platelet-poor plasma samples*) into the remaining tubes. Use Standard 1 to produce a 3-fold dilution series (below). Mix each tube thoroughly before the next transfer. Standard 1 serves as the high standard. The calibrator diluent serves as the blank.



DILUTED MICROPARTICLE COCKTAIL PREPARATION

1. Centrifuge the Microparticle Cocktail vial for 30 seconds at 1000 x g prior to removing the cap.
2. Gently vortex the vial to resuspend the microparticles, taking precautions not to invert the vial.
3. Dilute the Microparticle Cocktail in the mixing bottle provided.

Number of Wells Used	Microparticle Cocktail	+	Microparticle Diluent
96	0.500 mL	+	5.00 mL
72	0.375 mL	+	3.75 mL
48	0.250 mL	+	2.50 mL
24	0.125 mL	+	1.25 mL

4. To prepare the RANTES microparticles, add the RANTES microparticle stock into previously diluted microparticles from Step 1 following the table below.

Number of Wells Used	Diluted Microparticle Cocktail	+	RANTES Microparticles
96	5.5 mL	+	55 µL
72	4.125 mL	+	41.25 µL
48	2.75 mL	+	27.5 µL
24	1.375 mL	+	13.75 µL

Note: *Protect microparticles from light during handling. Diluted microparticles cannot be stored. Prepare microparticles within 30 minutes of use.*

DILUTED BIOTIN-ANTIBODY COCKTAIL PREPARATION

1. Dilute the reconstituted Biotin-Antibody Cocktail in Biotin Antibody Diluent 2. Mix gently.

Number of Wells Used	Biotin-Antibody Cocktail	+	Biotin Antibody Diluent 2
96	0.500 mL	+	5.00 mL
72	0.375 mL	+	3.75 mL
48	0.250 mL	+	2.50 mL
24	0.125 mL	+	1.25 mL

STREPTAVIDIN-PE PREPARATION

Use a polypropylene amber bottle or a polypropylene tube wrapped with aluminum foil. Protect Streptavidin-PE from light during handling and storage.

1. Centrifuge the Streptavidin-PE vial for 30 seconds at 1000 x g prior to removing the cap.
2. Gently vortex the vial, taking precautions not to invert the vial.
3. Dilute the Streptavidin-PE concentrate in Wash Buffer.

Number of Wells Used	Streptavidin-PE Concentrate	+	Wash Buffer
96	220 µL	+	5.35 mL
72	165 µL	+	4.00 mL
48	110 µL	+	2.65 mL
24	55 µL	+	1.35 mL

INSTRUMENT SETTINGS

Note: *Adjust the probe height setting on the analyzer to avoid puncturing the plate. Calibrate the analyzer using the proper reagents for superparamagnetic microparticles (refer to instrument manual).*

Luminex® MAGPIX® analyzer:

a) Sample volume: 50 µL

b) Assign the microparticle region for each analyte being measured (see page 1)

c) 50 count/region

d) Collect Median Fluorescence Intensity (MFI)

Luminex® 100/200™, FLEXMAP 3D®, xMAP INTELLIFLEX®, and Bio-Rad® Bio-Plex® analyzers:

Note: *Ensure that the instrument flow rate is set to the default of 60 µL/minute (fast) for all flow based analyzers.*

a) Sample volume: 50 µL

b) Bead Type:

i. Luminex® 100/200™ , FLEXMAP 3D®, and xMAP INTELLIFLEX® select MagPlex

ii. Bio-Rad® Bio-Plex® Manager use Bio-Plex® MagPlex Beads (Magnetic)

c) Doublet Discriminator gates:

i. Luminex® 100/200™ and FLEXMAP 3D®, set at 8000 and 16,500

ii. xMAP INTELLIFLEX® set at 7000 and 17,000

iii. Bio-Rad® Bio-Plex® Manager set at 8000 and 23,000

d) Reporter Gain Setting:

i. Luminex® 100/200™ use Default setting

ii. FLEXMAP 3D® use Standard PMT setting

iii. xMAP INTELLIFLEX® use Luminex® 200™ Operating Mode on Low PMT setting

iv. Bio-Rad® Bio-Plex® Manager use the low RP1 target value for the CAL2 setting

e) Assign the microparticle region for each analyte being measured (see page 1)

f) 50 count/region

g) Collect MFI

ASSAY PROCEDURE

Bring all reagents and samples to room temperature before use. It is recommended that all standards, controls, and samples be assayed in duplicate.

Note: *Protect microparticles and Streptavidin-PE from light at all times.*

1. Prepare all reagents, working standards, and samples as directed in the previous sections.
2. Add 50 µL of standard, control, or sample* per well. A plate layout is provided to record standards and samples assayed.
3. Resuspend the diluted Microparticle Cocktail by inversion or vortexing. Add 50 µL of the microparticle cocktail to each well of the microplate. Securely cover with a foil plate sealer. Incubate for 2 hours at room temperature on a horizontal orbital microplate shaker (0.12" orbit) set at 800 ± 50 rpm.
4. Using a magnetic device designed to accommodate a microplate, wash by applying the magnet to the bottom of the microplate, allow 1 minute before removing the liquid, filling each well with Wash Buffer (100 µL) and allow 1 minute before removing the liquid again. Uniform removal of liquid is essential for good performance. **Note:** ***Do NOT blot; this may cause a loss of microparticles.*** Perform the wash procedure three times.
5. Add 50 µL of diluted Biotin-Antibody Cocktail to all wells. Securely cover with a foil plate sealer and incubate for 1 hour at room temperature on the shaker set at 800 ± 50 rpm.
6. Repeat the wash as in step 4.
7. Add 50 µL of diluted Streptavidin-PE to all wells. Securely cover with a foil plate sealer and incubate for 30 minutes at room temperature on the shaker set at 800 ± 50 rpm.
8. Repeat the wash as in step 4.
9. Resuspend the microparticles by adding 100 µL of Wash Buffer to each well. Incubate for 2 minutes on the shaker set at 800 ± 50 rpm.
10. Read within 90 minutes using the Luminex® or Bio-Rad® analyzer.
    Note: *Resuspend microparticles immediately prior to reading by shaking the plate for 2 minutes on the plate shaker set at 800* ± 50 rpm.

*Samples require dilution. See Sample Preparation section.

ASSAY PROCEDURE SUMMARY

Note: *Protect microparticles and Streptavidin-PE from light at all times.*

❶ Prepare all reagents as instructed.

↓

❷ Add 50 µL of standard, control, or sample* to each well.

↓

❸ Add 50 µL of diluted Microparticle Cocktail to each well.
Incubate for 2 hours at RT on a shaker at 800 rpm.

↓

❹ Wash by removing the liquid from each well, filling with 100 µL Wash Buffer, and removing the liquid again.
Perform the wash 3 times.

↓

❺ Add 50 µL of diluted Biotin-Antibody Cocktail to each well.
Cover and incubate for 1 hour at RT on the shaker at 800 rpm.

↓

❻ Repeat the wash as in step 4.

↓

❼ Add 50 µL of diluted Streptavidin-PE to each well.
Incubate for 30 minutes at RT on the shaker at 800 rpm.

↓

❽ Repeat the wash as in step 4.

↓

❾ Add 100 µL of Wash Buffer to each well.
Incubate for 2 minutes at RT on the shaker at 800 rpm.

↓

❿ Read within 90 minutes using a Luminex® or Bio-Rad® analyzer
Note: *Resuspend microparticles immediately prior to reading.*

*Samples require dilution. See Sample Preparation section.

CALCULATION OF RESULTS

Use the Standard concentrations on the Standard Value Card and calculate 3-fold dilutions for the remaining levels. Average the duplicate readings for each standard and sample and subtract the average blank Median Fluorescence Intensity (MFI).

Create a standard curve for each analyte by reducing the data using computer software, such as Bio-Techne® Quantist™, capable of generating a five parameter logistic (5-PL) curve-fit.

Since samples have been diluted, the concentration read from the standard curve must be multiplied by the dilution factor.

CALIBRATION

This assay is calibrated against highly purified recombinant human chemokines produced at R&D Systems®.

PRECISION

Intra-Assay Precision - Generated from the mean of the %CV's from 40 reportable results across two different concentrations of analytes in a single serum assay.

Inter-Assay Precision - Generated from the mean of the %CV's across two different concentrations of analytes across 30 different serum assays.

Analyte	Intra-Assay (%CV)	Inter-Assay (%CV)
Eotaxin	4.8	7.4
GROα	1.9	5.6
IL-8	3.2	8.4
IP-10	3.3	6.6
MCP-1	1.8	6.3
MIP-1α	2.9	5.7
MIP-1β	1.7	7.9
RANTES	1.8	7.5

ACCURACY

Linearity - The data represents mean spiked or natural linearity in serum matrix samples. Samples with natural linearity are marked with an asterisk.

Spiked Recovery - The data represents mean percent recovery of spiked standards ranging from low, medium, and high concentration in serum matrix samples.

Analyte	n=	Linearity Average %	n=	Recovery Average %
Eotaxin	4	68	4	156
GROα	4	97	4	139
IL-8	4	118	4	78
IP-10	4	124	4	72
MCP-1*	4	80		HE
MIP-1α	4	95	4	111
MIP-1β	4	109	4	95
RANTES*	4	106		HE

**Natural linearity*

HE = Spiked recovery was not observed due to natural linearity in high endogenous samples.

SPECIFICITY

The assay was tested for cross-reactivity and interference with the following factors. Less than 0.5% cross-reactivity and interference was observed unless otherwise noted on the analyte specific datasheet.

Recombinant human:

4-1BB Ligand
6Ckine
α_2-Macroglobulin
Amphiregulin
Angiogenin
APRIL
B7-1
B7-2
B7-H2
B7-H3
B7-H4
B7-H6
B7-H7
BAFF/BLyS
BLC/BCA-1
Cathepsin C
Cathepsin H
CCL7/MCP-3
CCL19/MIP-3β
CCL20/MIP-3α
CCL22/MDC
CD27 Ligand/CD70
CD30 Ligand
CD40 Ligand/TNFSF5
CNTF
Cripto-1
CXCL2/GROβ
CXCL5/ENA-78
CXCL6/GCP-2/LIX
CXCL7/NAP-2
EGF
EGFR
ErbB2
ErbB3
ErbB4
Fas Ligand
FGF-4
FGF-5
FGF-6
FGF-7/KGF
FGF-16
FGF acidic
FGF basic
FGF R1α (IIIb)
FGF R1α (IIIc)
FGF Rβ (IIIb)
FGF R1β (IIIc)
Fibrinogen
Flt-3 Ligand
G-CSF
G-CSF R
GITR Ligand
GM-CSF
GM-CSF Rα
GM-CSF Rβ
gp130
Granzyme B
GROγ
HB-EGF
HCC-4
HGF
I-309
IFN-α/β R1
IFN-α/β R2
IFN-α 1a
IFN-α 1b
IFN-α 2
IFN-α 4a
IFN-α 4b
IFN-α 5
IFN-α 6
IFN-α 7
IFN-α 8
IFN-α 10
IFN-α 14
IFN-α 16
IFN-α 17
IFN-α 21
IFN-γ R1
IGF-I
IGF-II
IL-1α/IL-1F1
IL-1β/IL-1F2
IL-1ra/IL-1F3
IL-1 RAcP/IL-1 R3
IL-1 RI
IL-1 RII
IL-2
IL-2 Rα
IL-3
IL-3 Rα
IL-4
IL-4 R
IL-5
IL-5 Rα
IL-6
IL-6 Rα
IL-6 Rα/gp130
IL-7
IL-9
IL-10
IL-11
IL-12 Rβ1
IL-12 Rβ2
IL-12p40
IL-12 p70
IL-13
IL-13 Rα1
IL-13 Rα2
IL-15
IL-15 Rα
IL-15/IL-15 Rα Complex
IL-17A
IL-17A/F
IL-17B
IL-17B R

SPECIFICITY *CONTINUED*

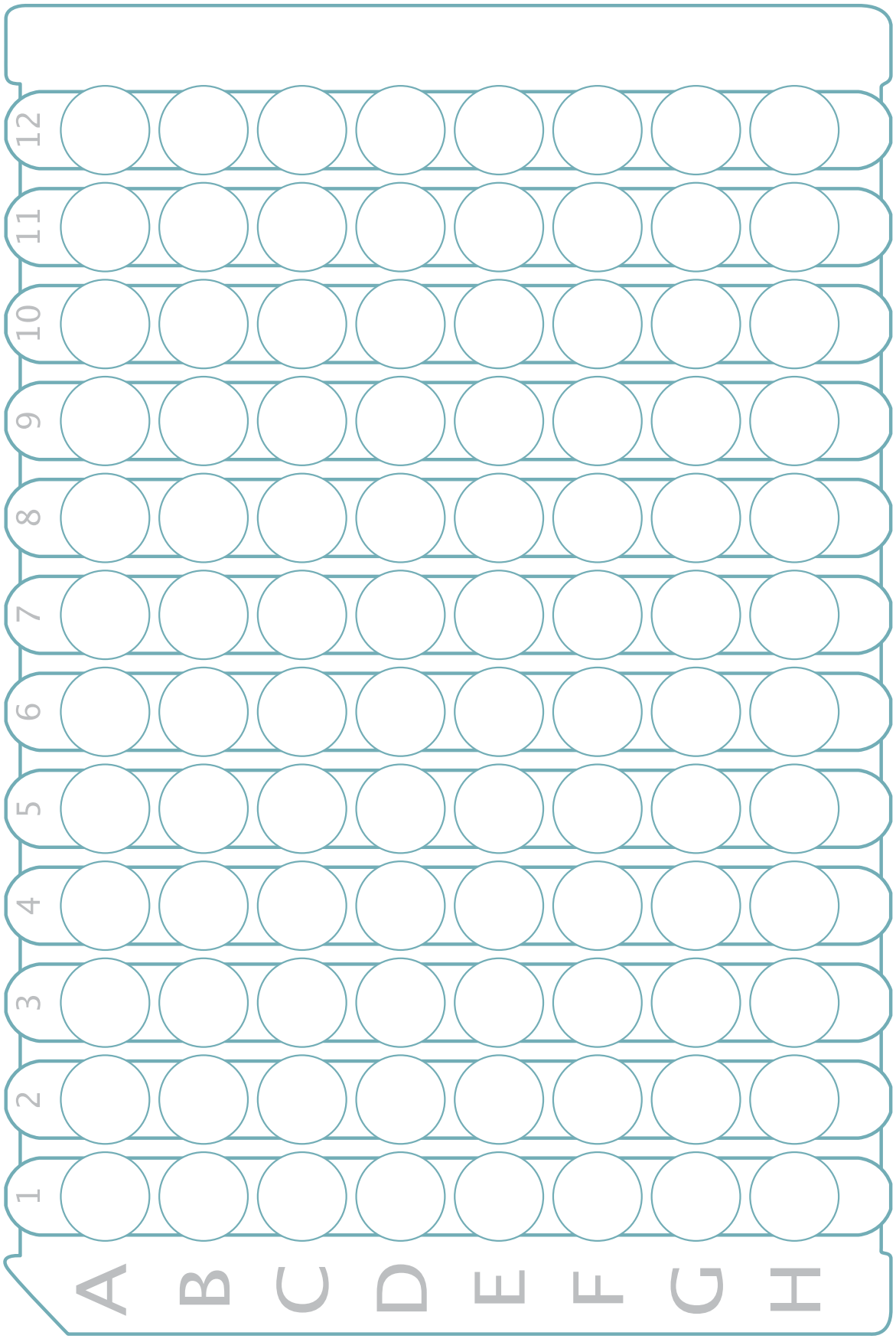
IL-17C
IL-17D
IL-17E/IL-25
IL-17F
IL-17 R
IL-17 RC
IL-17 RD
IL-18
IL-18 Rα
IL-18 Rβ
IL-23p40-p19 het
IL-27
IL-33
IL-36Ra/FIL-1δ
IL-36α
IL-36β
IL-36γ
IL-37/FIL-1ζ/IL-1F7
IL-38/IL-1F10
Integrin α5β3
I-TAC
LAP (TGF-β1)
LIF
LIF R
LIGHT
LT-α/TNF-β
LT α1/β2
LT α2/β1
MCP-2
MCP-4
M-CSF
MFG-E8
MIG
OPG
OSM
OX40 Ligand
PARC/MIP-4
PD-1
PDGF-AA
PDGF-AB/BB
PD-L1/B7-H1
PD-L2
PF-4
Pleiotrophin/PTN
PlGF
SDF-1α
SDF-1β
Serpin B9/PI-9
ST2
Syndecan-2
TGF-α
THBS
TNF-α
TNF RI
TNF RII
TRAIL/TNFSF10
TRAIL R3
TRAIL R4
TRANCE
TSG-6
TSG-14/Pentraxin-3
TWEAK
VEGF
VEGF R1/Flt-1
VEGF R2/Flk-1/KDR
VEGF/PlGF

Recombinant human multiplex partners:

CCL2/MCP-1
CCL3/MIP-1α
CCL4/MIP-1β
CCL5/RANTES
CCL11/Eotaxin
CXCL1/GROα
CXCL10/IP-10
IL-8/CXCL8

PLATE LAYOUT

Use this plate layout to record standards and samples assayed.



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