User Guide

MILLIPLEX® Human Cytokine/Chemokine Magnetic Bead Panel

96-Well Plate Assay

HCYTOMAG-60K
HCYTMAG-60K-PX29
HCYTMAG60PMX29BK
HCYTMAG-60K-PX30
HCYTMAG60PMX30BK
HCYTMAG-60K-PX38
HCYTMAG60PMX38BK
HCYTMAG-60K-PX41
HCYTMAG60PMX41BK

Introduction

"Cytokine" is a general term used for a diverse group of soluble proteins and peptides which act as regulators under both normal and pathological conditions to modulate the functional activities of individual cells and tissues. These proteins also mediate direct interactions between cells and regulate processes taking place in the extracellular environment. Cytokines differ from hormones in that they act on a wider spectrum of target cells. Also, unlike hormones, they are not produced by specialized cells which are organized in specialized glands. The cytokine group of proteins includes lymphokines, interferons, colony stimulating factors and chemokines. Cytokine and chemokine research plays a significant role in achieving a deeper understanding of the immune system and its multi-faceted response to most antigens, as well as disease states such as inflammatory disease, allergic reactions, IBD, sepsis, and cancer.

The MILLIPLEX® portfolio offers the broadest selection of analytes across a wide range of disease states and species. Once the analytes of interest have been identified, you can rely on the quality that we build into each kit to produce results you can trust. In addition to the assay characteristics listed in the protocol, other performance criteria evaluated during the verification process include: cross-reactivity, dilution linearity, kit stability, and sample behavior (for example, detectability and stability).

Each MILLIPLEX® panel and kit includes:

- Quality controls (QCs) provided to qualify assay performance
- Comparison of standard (calibrator) and QC lots to a reference lot to ensure lot-to-lot consistency
- Optimized serum matrix to mimic native analyte environment
- Detection antibody cocktails designed to yield consistent analyte profiles within panel

In addition, each panel and kit meets stringent manufacturing criteria to ensure batch-to-batch reproducibility. The MILLIPLEX® Human Cytokine/Chemokine Magnetic Bead Panel thus enables you to focus on the therapeutic potential of cytokines as well as the modulation of cytokine expression. Coupled with the Luminex® xMAP® platform in a magnetic bead format, you receive the advantage of ideal speed and sensitivity, allowing quantitative multiplex detection of dozens of analytes simultaneously, which can dramatically improve productivity.

The MILLIPLEX® Human Cytokine/Chemokine Magnetic Bead Panel is part of the most versatile system available for cytokine and chemokine research. From our single to multiplex biomarker solutions, we partner with you to design, develop, analytically verify and build the most comprehensive library available for protein detection and quantitation.

MILLIPLEX® products offer you:

- The ability to select a 38-plex (for serum/plasma) or 41-plex (for cell culture) pre-mixed kit.
- The ability to choose any combination of analytes from our panel of 41 analytes to design a custom kit that better meets your needs.
- A convenient "all-in-one" box format that gives you the assurance that you will have all the necessary reagents you need to run your assay.

The MILLIPLEX® Human Cytokine/Chemokine Panel is to be used for the simultaneous quantification of the following 41 human cytokines and chemokines in human tissue/cell lysate and culture supernatant samples and serum or plasma samples: EGF, Eotaxin, G-CSF, GM-CSF, IFNα2, IFNγ, IL-10, IL-12P40, IL-12P70, IL-13, IL-15, IL-17A, IL-1RA, IL-1α, IL-1β, IL-2, IL-3, IL-4, IL-5, IL-6, IL-7, IL-8, IP-10, MCP-1, MIP-1α, MIP-1β, RANTES, TNFα, TNFβ, VEGF,FGF-2, TGF-α, FIT-3L, Fractalkine, GRO, MCP-3, MDC, PDGF-AA, PDGF-AB/BB, sCD40L, and IL-9.

For research use only. Not for use in diagnostic procedures.
Please read entire protocol before use.
It is important to use same assay incubation conditions throughout your study.

Principle

MILLIPLEX® products are based on the Luminex® xMAP® technology - one of the fastest growing and most respected multiplex technologies offering applications throughout the life-sciences and capable of performing a variety of bioassays including immunoassays on the surface of fluorescent-coded magnetic beads known as MagPlex®-C microspheres.

- Luminex® products proprietary techniques to internally color-code microspheres with two fluorescent dyes. Through precise concentrations of these dyes, distinctly colored bead sets of 500-5.6 µm polystyrene microspheres or 80-6.45 µm magnetic microspheres can be created, each of which is coated with a specific capture antibody.
- After an analyte from a test sample is captured by the bead, a biotinylated detection antibody is introduced.
- The reaction mixture is then incubated with Streptavidin-PE conjugate, the reporter molecule, to complete the reaction on the surface of each microsphere.

- The following Luminex® instruments can be used to acquire and analyze data using two detection methods:
- The Luminex® analyzers, Luminex® 200™, FLEXMAP 3D®, and xMAP® INTELLIFLEX, are flow cytometry-based instruments that integrate key xMAP® detection components, such as lasers, optics, advanced fluidics and high-speed digital signal processors.
- The Luminex® analyzer (MAGPIX®), a CCD-based instrument that integrates key xMAP® capture and detection components with the speed and efficiency of magnetic beads.
- Each individual microsphere is identified and the result of its bioassay is quantified based on fluorescent reporter signals. We combine the streamlined data acquisition power of Luminex® xPONENT® acquisition software with sophisticated analysis capabilities of the new MILLIPLEX® Analyst 5.1, integrating data acquisition and analysis seamlessly with all Luminex® instruments.
- xMAP® INTELLIFLEX runs on INTELLIFLEX software for instrument control, run setup and generating high quality data with flexible output options. Data can be exported in xPONENT® style CSV files for compatibility with many existing analytical applications, or in the new, customizable INTELLIFLEX file format. The INTELLIFLEX file format is intended for flexibility and simplicity, allowing the user to freely select which data points to include and to reduce the time to analysis.

The capability of adding multiple conjugated beads to each sample results in the ability to obtain multiple results from each sample. Open-architecture xMAP® technology enables multiplexing of many types of bioassays reducing time, labor and costs over traditional methods.

Storage Conditions Upon Receipt

- Recommended storage for kit components is 2-8 °C.
- Once the standards and controls have been reconstituted, immediately transfer contents into polypropylene vials. **DO NOT STORE RECONSITUTED STANDARDS OR CONTROLS IN GLASS VIALS**. For long-term storage, freeze reconstituted standards and controls at ≤ -20 °C. Avoid multiple (> 2) freeze thaw cycles.
- **DO NOT FREEZE** Antibody-Immobilized Beads, Detection Antibody, and Streptavidin-Phycoerythrin.

Reagents Supplied

Store all reagents at 2-8 °C.

Reagents	Volume	Quantity	Cat. No.
Human Cytokine/Chemokine Standard	Lyophilized	1 vial	MXH8060-2 (for 29, 30plex) or MXH8060 (for 38, 41plex)
Human Cytokine Quality Controls 1 and 2	Lyophilized	2 vials	MXH6060-2 (for 29, 30plex) or MXH6060 (for 38, 41plex)
Serum Matrix*	Lyophilized	1 vial	MXHSM
Set of one 96-Well Plates with 2 Sealers	-	1 set	-
Assay Buffer	30 mL	1 bottle	L-AB
10X Wash Buffer**	60 mL	1 bottle	L-WB
Human Cytokine Detection Antibodies	3.2 mL	1 bottle	MXH1060-1, MXH1060-2, MXH1060-3, or MXH1060-4
Streptavidin-Phycoerythrin	3.2 mL	1 bottle	L-SAPE9 (Use with Cat. No. MXH1060-1) Or L-SAPE3 (Use with Cat. No. MXH1060-2) Or L-SAPE10 (Use with Cat. No. MXH1060-3) Or L-SAPE11 (Use with Cat. No. MXH1060-4)
Bead Diluent (not provided with premixed panel)	3.5 mL	1 bottle	LBD
Mixing Bottle (not provided with premixed panel)	-	1 bottle	-

* Contains 0.08% Sodium azide (required for serum and plasma samples only)
** Contains 0.05% Proclin™

Human Cytokine/Chemokine Antibody-Immobilized Premixed Magnetic Beads

Reagents	Volume	Quantity	Cat. No.
Premixed 29-plex Beads	3.5 mL	1 bottle	HCYPMX29-MAG
Premixed 30-plex Beads (Premixed 29-plex + RANTES)	3.5 mL	1 bottle + 1 vial	HCYPMX29-MAG + HCYRNTS-MAG
Premixed 38-plex Beads	3.5 mL	1 bottle	HCYPMX38-MAG
Premixed 41-plex Beads (Premixed 38-plex + RANTES, PDGF-AA, PDGF-AB/BB)	3.5 mL	1 bottle + 3 vials	HCYPMX38-MAG + HCYRNTS-MAG, HPDGFAA-MAG, HPDGFBB-MAG

Included Human Cytokine/Chemokine Antibody-Immobilized Beads are dependent on customizable selection of analytes within the panel.

Human Cytokine/Chemokine Antibody-Immobilized Magnetic Beads

Bead/Analyte Name	Luminex® Magnetic Bead Region	Customizable 41 Analytes (50X concentration, 90 µL) Available	Cat. No.	29-Plex Premixed Beads	38-Plex Magnetic Premixed Beads	41-Plex Premixed Beads
Anti-Human EGF Bead	12	✔	HEGF-MAG	✔	✔	✔
Anti-Human FGF-2 Bead	13	✔	HCYFGF2-MAG	-	✔	✔
Anti-Human Eotaxin Bead	14	✔	HETXN-MAG	✔	✔	✔
Anti-Human TGF-α Bead	15	✔	HCYTGFA-MAG	-	✔	✔
Anti-Human G-CSF Bead	18	✔	HGCSF-MAG	✔	✔	✔
Anti-Human FIt-3L Bead	19	✔	HFLT3L-MAG	-	✔	✔
Anti-Human GM-CSF Bead	20	✔	HGMCSF-MAG	✔	✔	✔
Anti-Human Fractalkine Bead	21	✔	HFKN-MAG	-	✔	✔
Anti-Human IFNα2 Bead	22	✔	HIFNA2-MAG	✔	✔	✔
Anti-Human IFNγ Bead	25	✔	HCYIFNG-MAG	✔	✔	✔
Anti-Human GRO Bead	26	✔	HGR0-MAG	-	✔	✔
Anti-Human IL-10 Bead	27	✔	HCYIL10-MAG	✔	✔	✔
Anti-Human MCP-3 Bead	28	✔	HMCP3-MAG	-	✔	✔
Anti-Human IL-12p40 Bead	29	✔	HIL12P40-MAG	✔	✔	✔
Anti-Human MDC Bead	30	✔	HMDC-MAG	-	✔	✔
Anti-Human IL-12P70 Bead	33	✔	HIL12P70-MAG	✔	✔	✔
Anti-Human PDGF-AA Bead	34	✔	HPDGFAA-MAG	-	-	✔
Anti-Human IL-13 Bead	35	✔	HIL13-MAG	✔	✔	✔
Anti-Human PDGF-AB/BB Bead	36	✔	HPDGFBB-MAG	-	-	✔
Anti-Human IL-15 Bead	37	✔	HIL15-MAG	✔	✔	✔
Anti-Human sCD40L Bead	38	✔	HCD40L-MAG	-	✔	✔
Anti-Human IL-17A Bead	39	✔	HIL17-MAG	✔	✔	✔
Anti-Human IL-1RA Bead	42	✔	HIL1RA-MAG	✔	✔	✔
Anti-Human IL-1α Bead	44	✔	HIL1A-MAG	✔	✔	✔
Anti-Human IL-9 Bead	45	✔	HIL9-MAG	-	✔	✔
Anti-Human IL-1β Bead	46	✔	HCYIL1B-MAG	✔	✔	✔
Anti-Human IL-2 Bead	48	✔	HIL2-MAG	✔	✔	✔
Anti-Human IL-3 Bead	51	✔	HIL3-MAG	✔	✔	✔
Anti-Human IL-4Bead	53	✔	HIL4-MAG	✔	✔	✔
Anti-Human IL-5 Bead	55	✔	HIL5-MAG	✔	✔	✔
Anti-Human IL-6 Bead	57	✔	HCYIL6-MAG	✔	✔	✔
Anti-Human IL-7 Bead	61	✔	HIL7-MAG	✔	✔	✔
Anti-Human IL-8 Bead	63	✔	HCYIL8-MAG	✔	✔	✔

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Bead/Analyte Name	Luminex® Magnetic Bead Region	Customizable 41 Analytes (50X concentration, 90 µL) Available	Cat. No.	29-Plex Premixed Beads	38-Plex Magnetic Premixed Beads	41-Plex Premixed Beads
Anti-Human IP-10 Bead	65	✔	HIP10-MAG	✔	✔	✔
Anti-Human MCP-1 Bead	67	✔	HCYMCP1-MAG	✔	✔	✔
Anti-Human MIP-1αBead	72	✔	HMIP1A-MAG	✔	✔	✔
Anti-Human MIP-1β Bead	73	✔	HMIP1B-MAG	✔	✔	✔
Anti-Human RANTES Bead	74	✔	HCYRNTS-MAG	-	-	✔
Anti-Human TNFα Bead	75	✔	HCYTNFA-MAG	✔	✔	✔
Anti-Human TNFβ Bead	76	✔	HTNFB-MAG	✔	✔	✔
Anti-Human VEGF Bead	78	✔	HCYVEGF-MAG	✔	✔	✔

Materials Required (Not included)

Reagents

MAGPIX® Drive Fluid PLUS (Cat. No. 40-50030), xMAP® Sheath Fluid PLUS (Cat. No. 40-50021), or xMAP® Sheath Concentrate PLUS (Cat. No. 40-50023)

Instrumentation/Materials

- Adjustable pipettes with tips capable of delivering 25 µL to 1000 µL
- Multichannel pipettes capable of delivering 5 µL to 50 µL, or 25 µL to 200 µL
- Reagent reservoirs
- Polypropylene microfuge tubes
- Rubber bands
- Aluminum foil
- Absorbent pads
- Laboratory vortex mixer
- Sonicator (Branson Ultrasonic Cleaner Model B200 or equivalent)
- Titer plate shaker (VWR® Microplate Shaker Cat. No. 12620-926 or equivalent)
- Luminex® 200™, HTS, FLEXMAP 3D®, MAGPIX® instrument with xPONENT® software, or xMAP® INTELLIFLEX instrument with INTELLIFLEX software by Luminex® Corporation
- Automatic plate washer for magnetic beads (BioTek® 405 LS and 405 TS, Cat. No. 40-094, 40-095, 40-096, 40-097 or equivalent) or Handheld Magnetic Separation Block (Cat. No. 40-285 or equivalent).

Note: If a plate washer or handheld magnetic separation block for magnetic beads is not available, one can use a microtiter filter plate (Cat. No. MX-PLATE) to run the

assay using a vacuum filtration unit (Vacuum Manifold, Cat. No. MSVMHTS00 or equivalent with Vacuum Pump, Cat. No. WP6111560 or equivalent).

Safety Precautions

- All blood components and biological materials should be handled as potentially hazardous. Follow universal precautions as established by the Centers for Disease Control and Prevention and by the Occupational Safety and Health Administration when handling and disposing of infectious agents.
- Sodium azide or Proclin™ has been added to some reagents as a preservative. Although the concentrations are low, Sodium azide and Proclin™ may react with lead and copper plumbing to form highly explosive metal azides. Dispose of unused contents and waste in accordance with international, federal, state, and local regulations.

Symbol Definitions

Ingredient	Cat. No.	Label	
Streptavidin-Phycoerythrin	L-SAPE10		**Warning.** Causes serious eye irritation. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Streptavidin-Phycoerythrin	L-SAPE11		**Warning.** Causes serious eye irritation. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Streptavidin-Phycoerythrin	L-SAPE3		**Warning.** Causes serious eye irritation. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Streptavidin-Phycoerythrin	L-SAPE9		**Warning.** Causes serious eye irritation. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
10X Wash Buffer	L-WB		**Warning.** May cause an allergic skin reaction. Wear protective gloves. IF ON SKIN: Wash with plenty of soap and water.
Serum Matrix	MXHSM	No Symbol Required	Harmful to aquatic life with long lasting effects. Avoid release to the environment.

Ingredient	Cat. No.	Label	
Human Cytokine Detection Antibodies	MXH1060-1		**Warning.** Causes serious eye irritation. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Human Cytokine Detection Antibodies	MXH1060-2		**Warning.** Causes serious eye irritation. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Human Cytokine Detection Antibodies	MXH1060-3		**Warning.** Causes serious eye irritation. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Human Cytokine/Chemokine Quality Control 1 & 2	MXH6060	 	**Danger.** Harmful if swallowed. Causes serious eye damage. Harmful to aquatic life with long lasting effects. Avoid release to the environment. Wear eye protection. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical advice/attention.
Human Cytokine/Chemokine Quality Control 1 & 2	MXH6060-2	 	**Danger.** Harmful if swallowed. Causes serious eye damage. Harmful to aquatic life with long lasting effects. Avoid release to the environment. Wear eye protection. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical advice/attention.
Human Cytokine/Chemokine Standard	MXH8060	 	**Danger.** Harmful if swallowed. Causes serious eye damage. Harmful to aquatic life with long lasting effects. Avoid release to the environment. Wear eye protection. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical advice/attention.

Ingredient	Cat. No.	Label	
Human Cytokine/Chemokine Standard	MXH8060-2	 	**Danger.** Harmful if swallowed. Causes serious eye damage. Harmful to aquatic life with long lasting effects. Avoid release to the environment. Wear eye protection. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical advice/attention.

Technical Guidelines

To obtain reliable and reproducible results, the operator should carefully read this entire manual and fully understand all aspects of each assay step before running the assay. The following notes should be reviewed and understood before the assay is set-up.

- FOR RESEARCH USE ONLY. NOT FOR USE IN DIAGNOSTIC PROCEDURES.
- Do not use beyond the expiration date on the label.
- Do not mix or substitute reagents with those from other lots or sources.
- The Antibody-Immobilized Beads are light sensitive and must be protected from light at all times. Cover the assay plate containing beads with opaque plate lid or aluminum foil during all incubation steps.
- It is important to allow all reagents to warm to room temperature (20-25 °C) before use in the assay.
- Incomplete washing can adversely affect the assay outcome. All washing must be performed with the Wash Buffer provided.
- After hydration, all standards and controls must be transferred to polypropylene tubes.
- The standards prepared by serial dilution must be used within 1 hour of preparation. Discard any unused standards except the standard stock which may be stored at ≤ -20 °C for 1 month and at ≤ -80 °C for greater than one month.
- If samples fall outside the dynamic range of the assay, further dilute the samples with the appropriate diluent and repeat the assay.
- Any unused mixed Antibody-Immobilized Beads may be stored in the Bead Mix bottle at 2-8 °C for up to one month.
- During the preparation of the standard curve, make certain to mix the higher concentration well before making the next dilution. Use a new tip with each dilution.
- The plate should be read immediately after the assay is finished. If, however, the plate cannot be read immediately, seal the plate, cover with aluminum foil or an opaque lid, and store the plate at 2-8 °C for up to 24 hours. Prior to reading,

agitate the plate on the plate shaker at room temperature for 10 minutes. Delay in reading a plate may result in decreased sensitivity for some analytes.

- The titer plate shaker should be set at a speed to provide maximum orbital mixing without splashing of liquid outside the wells. For the recommended plate shaker, this would be a setting of 5-7, which is approximately 500-800 rpm.
- When reading the assay on the Luminex® 200™ instrument, adjust probe height according to the protocols recommended by Luminex® to the kit solid plate or to the recommended filter plates using 3 alignment discs. When reading the assay on the MAGPIX® instrument, adjust probe height according to the protocols recommended by Luminex® to the kit solid plate or to the recommended filter plates using 2 alignment discs. When reading the assay on the FLEXMAP 3D® instrument, adjust probe height according to the protocols recommended by Luminex® to the kit solid plate using 1 alignment disc.
- For the FLEXMAP 3D® instrument, when using the solid plate in the kit, the final resuspension should be with 150 µL Sheath Fluid PLUS in each well and 75 µL should be aspirated.
- For the xMAP® INTELLIFLEX instrument, adjust probe height based on the type of plate you are using, place an alignment disk or an alignment sphere in the well according to the protocol recommended by Luminex®.
- Ensure that the needle probe is clean. This may be achieved by sonication and/or alcohol flushes.
- For cell culture supernatants or tissue extraction, use the culture or extraction medium as the matrix solution in blank, standard curve and controls. If samples are diluted in assay buffer, use the assay buffer as matrix.
- For serum/plasma sample that require a dilution instead of “Neat”, use the Serum Matrix provided in the kit as the diluent.
- For cell/tissue homogenate, the final cell or tissue homogenate should be prepared in a buffer that has a neutral pH, contains minimal detergents or strong denaturing detergents, and has an ionic strength close to physiological concentration. Avoid debris, lipids, and cell/tissue chunks. Centrifuge samples before use.
- Vortex all reagents well before adding to plate.

Sample Collection and Storage

Preparation of Serum Samples

- Allow the blood to clot for at least 30 minutes before centrifugation for 10 minutes at 1000 x g. Remove serum and assay immediately or aliquot and store samples at ≤ -20 °C.
- Avoid multiple (> 2) freeze/thaw cycles.
- When using frozen samples, it is recommended to thaw the samples completely, mix well by vortexing and centrifuge prior to use in the assay to remove particulates.

- Neat Serum samples (for measuring 38 cytokines, not including RANTES, PDGF-AA, PDGF-AB/BB) are used. When further dilution is required, use Serum Matrix as the diluent.
- When measuring RANTES, PDGF-AA, PDGF-AB/BB in serum, samples should be diluted 1:100 in the Assay Buffer and a standard curve with Assay Buffer matrix should be used accordingly. When further dilution beyond 1:100 is required, use Assay Buffer as the diluent.

Preparation of Plasma Samples

- Plasma collection using EDTA as an anti-coagulant is recommended. Centrifuge for 10 minutes at 1000 x g within 30 minutes of blood collection. Remove plasma and assay immediately or aliquot and store samples at ≤ -20 °C.
- Avoid multiple (> 2) freeze/thaw cycles.
- When using frozen samples, it is recommended to thaw the samples completely, mix well by vortexing and centrifuge prior to use in the assay to remove particulates.
- Neat Plasma samples (for measuring 38 cytokines, not including RANTES, PDGF-AA, PDGF-AB/BB) are used. When further dilution is required, use Serum Matrix as the diluent.
- When measuring RANTES, PDGF-AA, PDGF-AB/BB in plasma, sample should be diluted 1:100 in the Assay Buffer and a standard curve with Assay Buffer matrix should be used accordingly. When further dilution beyond 1:100 is required, use Assay Buffer as the diluent.

Preparation of Tissue Culture Supernatant

- Centrifuge the sample to remove debris and assay immediately or aliquot and store samples at ≤ -20 °C.
- Avoid multiple (> 2) freeze/thaw cycles.
- Tissue culture supernatant may require a dilution with an appropriate control medium prior to assay.

NOTE:

- A maximum of 25 µL per well of neat or diluted serum or plasma can be used. Tissue culture or other media may also be used.
- All samples must be stored in polypropylene tubes. **DO NOT STORE SAMPLES IN GLASS.**
- Avoid debris, lipids and cells when using samples with gross hemolysis or lipemia.
- Care must be taken when using heparin as an anticoagulant since an excess of heparin will provide falsely high values. Use no more than 10 IU heparin per mL of blood collected.

Preparation of Reagents for Immunoassay

Preparation of Antibody-Immobilized Beads

- If premixed beads are used, sonicate the premixed bead bottle 30 seconds and then vortex for 1 minute before use. To prepare 41 plex premixed beads, add 70 µL of RANTES, PDGF-AA and PDGF-AB/BB beads to the 38-plex premixed bead bottle. Mix well before use.
  (**Note**: Due to high concentration of RANTES, PDGF-AA, PDGF-AB/BB in serum/plasma, they have to be measured separately with **1:100** diluted serum/plasma. 38plex premixed beads are used for measuring all other 38 cytokines in serum/plasma with **Neat** serum/plasma)

- For individual vials of beads, sonicate each antibody-bead vial for 30 seconds; vortex for 1 minute. Add 60 µL from each antibody bead vial to the Mixing Bottle and bring final volume to 3.0 mL with Bead Diluent. Vortex the mixed beads well. Unused portion may be stored at 2-8 °C for up to one month. (**Note:** Due to the composition of magnetic beads, you may notice a slight color in the bead solution. This does not affect the performance of the beads or the kit.)

  Example 1: When using 20 cytokine antibody-immobilized beads, add 60 µL from each of the 20 bead sets to the Mixing Bottle. Then add 1.8 mL Bead Diluent.

  Example 2: When using 9 cytokine antibody-immobilized beads, add 60 µL from each of the 9 bead sets to the Mixing Bottle. Then add 2.46 mL Bead Diluent.

Preparation of Quality Controls

Before use, reconstitute Quality Control 1 and Quality Control 2 with 250 µL deionized water. Invert the vial several times to mix and vortex. Allow the vial to sit for 5-10 minutes. Transfer the reconstituted Quality Control 1 and Quality Control 2 into two appropriately labeled polypropylene microfuge tubes. Unused portion may be stored at ≤ -20 °C for up to one month.

Preparation of Wash Buffer

Bring the 10X Wash Buffer to room temperature and mix to bring all salts into solution. Dilute 60 mL of 10X Wash Buffer with 540 mL deionized water. Store unused portion at 2-8 °C for up to one month.

Preparation of Serum Matrix

This step is required for serum or plasma samples only.

Add 1.0 mL deionized water to the bottle containing lyophilized Serum Matrix. Mix well. Allow at least 10 minutes for complete reconstitution. Leftover reconstituted Serum Matrix should be stored at ≤ -20 °C for up to one month.

Preparation of Human Cytokine Standard

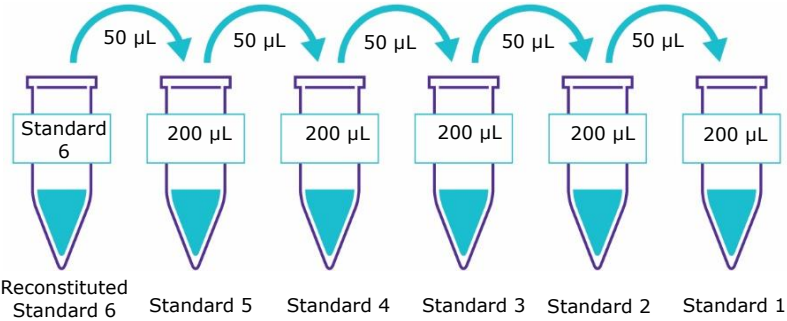
1. Prior to use, reconstitute the Human Cytokine Standard with 250 µL deionized water. Refer to table below for analyte concentrations. Invert the vial several times to mix. Vortex the vial for 10 seconds. Allow the vial to sit for 5-10 minutes. Transfer the reconstituted standard to an appropriately labeled polypropylene microfuge tube. This will be used as the standard 6; the unused portion may be stored at ≤ -20 °C for up to one month.

2. Preparation of Working Standards
Label five polypropylene microfuge tubes Standard 1 through Standard 5. Add 200 µL of Assay Buffer to each of the five tubes. Prepare serial dilutions by adding 50 µL of the reconstituted standard 6 to the Standard 5 tube, mix well and transfer 50 µL of the standard 5 to the Standard 4 tube, mix well and transfer 50 µL of the standard 4 to the Standard 3 tube, mix well and transfer 50 µL of the standard 3 to Standard 2 tube, mix well and transfer 50 µL of the standard 2 to the Standard 1 tube and mix well. The 0 pg/mL standard (Background) will be Assay Buffer.

Standard #	Add Deionized Water (µL)	Add Standard (volume)
Standard 6	250	0

Standard #	Add Assay Buffer (µL)	Add Standard (volume)
Standard 5	200	50 µL of Standard 6
Standard 4	200	50 µL of Standard 5
Standard 3	200	50 µL of Standard 4
Standard 2	200	50 µL of Standard 3
Standard 1	200	50 µL of Standard 2

Preparation of Standards



After serial dilutions, the tubes should have the following concentrations for constructing standard curves.

Standard	All Other Analytes (pg/mL)	PDGF-AA
Standard 1	3.2	Refer to QC analysis sheet for exact concentration
Standard 2	16	
Standard 3	80	
Standard 4	400	
Standard 5	2,000	
Standard 6	10,000	

Immunoassay Procedure

- Prior to beginning this assay, it is imperative to read this protocol completely and to thoroughly understand the Technical Guidelines.
- Allow all reagents to warm to room temperature (20-25 °C) before use in the assay.
- Diagram the placement of Standards [0 (Background), 1, 2, 3, 4, 5, and 6], Controls 1 and 2, and Samples on Well Map Worksheet in a vertical configuration. (**Note:** Most instruments will only read the 96-well plate vertically by default.) It is recommended to run the assay in duplicate.

- If using a filter plate, set the filter plate on a plate holder at all times during reagent dispensing and incubation steps so that the bottom of the plate does not touch any surface.

1. Add 200 µL of Wash Buffer into each well of the plate. Seal and mix on a plate shaker for 10 minutes at room temperature (20-25 °C).
2. Decant Wash Buffer and remove the residual amount from all wells by inverting the plate and tapping it smartly onto absorbent towels several times.
3. Add 25 µL of each Standard or Control into the appropriate wells. Assay Buffer should be used for 0 pg/mL standard (Background).
4. Add 25 µL of Assay Buffer to the sample wells.
5. Add 25 µL of appropriate matrix solution to the background, standards, and control wells. When assaying serum or plasma, use the Serum Matrix provided in the kit. When assaying tissue culture or other supernatant, use proper control culture medium as the matrix solution.
6. Add 25 µL of serum/plasma Sample (1:100 dilution for RANTES, PDGF-AA, and PDGF-AB/BB, Neat for all other 38 cytokines) or 25 µL cell culture sample into the appropriate wells.
7. Vortex Mixing Bottle and add 25 µL of the Mixed or Premixed Beads to each well. (**Note:** During addition of Beads, shake bead bottle intermittently to avoid settling.)
8. Seal the plate with a plate sealer. Wrap the plate with foil and incubate with agitation on a plate shaker overnight at 4 °C or 2 hours at room temperature (20-25 °C). An overnight incubation (16-18 hour) may improve assay sensitivity for some analytes.

Add 200 µL Wash Buffer per well

↓ Shake 10 min, RT

Decant

- Add 25 µL Standard or Control to appropriate wells
- Add 25 µL Assay Buffer to background and sample wells
- Add 25 µL appropriate Matrix Solution to background, standards, and control wells
- Add 25 µL Samples to sample wells
- Add 25 µL Beads to each well

↓ Incubate overnight at 4 °C or 2 hours at RT with shaking

9. Gently remove well contents and wash plate 2 times following instructions listed in the Plate Washing section.

10. Add 25 µL of Detection Antibodies into each well.
(**Note:** Allow the Detection Antibodies to warm to room temperature prior to addition.)

11. Seal, cover with foil and incubate with agitation on a plate shaker for 1 hour at room temperature (20-25 °C). **DO NOT ASPIRATE AFTER INCUBATION.**

12. Add 25 µL Streptavidin-Phycoerythrin to each well containing the 25 µL of Detection Antibodies.

13. Seal, cover with foil and incubate with agitation on a plate shaker for 30 minutes at room temperature (20-25 °C).

14. Gently remove well contents and wash plate 2 times following instructions listed in the Plate Washing section.

15. Add 150 µL of Sheath Fluid PLUS (or Drive Fluid PLUS if using MAGPIX®) to all wells. Resuspend the beads on a plate shaker for 5 minutes.

16. Run plate on Luminex® 200™, HTS, FLEXMAP 3D®, MAGPIX® instrument with xPONENT® software or xMAP® INTELLIFLEX instrument with INTELLIFLEX software.

17. Save and analyze the Median Fluorescent Intensity (MFI) data using a 5-parameter logistic or spline curve-fitting method for calculating cytokine/chemokines concentrations in samples.
(**Note:** For diluted samples, multiply the calculated concentration by the dilution factor.)

Remove well contents and wash 2X with 200 µL Wash Buffer

Add 25 µL Detection Antibodies per well

Incubate 1 hour at RT

Do Not Aspirate

Add 25 µL Streptavidin-Phycoerythrin per well

Incubate for 30 minutes at RT

Remove well contents and wash 2X with 200 µL Wash Buffer

Add 150 µL Sheath Fluid PLUS or Drive Fluid PLUS per well

Read on Luminex® instrument (100 µL, 50 beads per bead set)

Plate Washing

Solid Plate

If using a solid plate, use either a handheld magnet or magnetic plate washer.

- Handheld magnet (Cat. No. 40-285)
  Rest plate on magnet for 60 seconds to allow complete settling of magnetic beads. Remove well contents by gently decanting the plate in an appropriate waste receptacle and gently tapping on absorbent pads to remove residual liquid. Wash plate with 200 µL of Wash Buffer by removing plate from magnet, adding Wash Buffer, shaking for 30 seconds, reattaching to magnet, letting beads settle for 60 seconds and removing well contents as previously described after each wash. Repeat wash steps as recommended in Assay Procedure.

- Magnetic plate washer (Cat. No. 40-094, 40-095, 40-096 and 40-097)
  Please refer to specific automatic plate washer manual for appropriate equipment settings. Please note that after the final aspiration, there will be approximately 25 µL of residual wash buffer in each well. This is expected when using the BioTek® plate washer and this volume does not need to be aspirated from the plate.

If using an automatic plate washer other than BioTek® 405 LS or 405 TS, please refer to the manufacturer's recommendations for programming instructions.

Filter Plate (Cat. No. MX-PLATE)

If using a filter plate, use a vacuum filtration manifold to remove well contents. Wash plate with 200 µL/well of Wash Buffer, removing Wash Buffer by vacuum filtration after each wash. Repeat wash steps as recommended in the Assay Procedure.

Equipment Settings

Luminex® 200™, HTS, FLEXMAP 3D®, MAGPIX® instruments with xPONENT® software and xMAP® INTELLIFLEX instrument with INTELLIFLEX software:

These specifications are for the above listed instruments and software. Luminex® instruments with other software (for example, MasterPlex®, StarStation, LiquiChip, Bio-Plex® Manager™, LABScan™100) would need to follow instrument instructions for gate settings and additional specifications from the vendors for reading Luminex® magnetic beads.

For magnetic bead assays, each instrument must be calibrated and performance verified with the indicated calibration and verification kits.

Instrument	Calibration Kit	Verification Kit
Luminex® 200™ and HTS	xPONENT® 3.1 compatible Calibration Kit (Cat. No. LX2R-CAL-K25)	Performance Verification Kit (Cat. No. LX2R-PVER-K25)
FLEXMAP 3D®	FLEXMAP 3D® Calibrator Kit (Cat. No. F3D-CAL-K25)	FLEXMAP 3D® Performance Verification Kit (Cat. No. F3D-PVER-K25)
xMAP® INTELLIFLEX	xMAP® INTELLIFLEX Calibration Kit (Cat. No. IFX-CAL-K20)	xMAP® INTELLIFLEX Performance Verification Kit (Cat. No. IFX-PVER-K20)
MAGPIX®	MAGPIX® Calibration Kit (Cat. No. MPX-CAL-K25)	MAGPIX® Performance Verification Kit (Cat. No. MPX-PVER-K25)

NOTE: When setting up a Protocol using the xPONENT® software, you must select MagPlex® as the Bead Type in the Acquisition settings.

NOTE: These assays cannot be run on any instruments using Luminex® IS 2.3 or Luminex® 1.7 software.

The Luminex® probe height must be adjusted to the plate provided in the kit. Please use Cat. No. MAG-PLATE, if additional plates are required for this purpose.

Events	50, per bead
Sample Size	100 µL
Gate Settings	8,000 to 15,000
Reporter Gain	Default (low PMT)
Time Out	60 seconds
Bead Set	Customizable 41-Plex Beads

EGF	12
FGF-2	13
Eotaxin	14
TGF-α	15
G-CSF	18
Flt-3L	19
GM-CSF	20
Fractalkine	21
IFNα2	22
IFNγ	25
GRO	26
IL-10	27
MCP-3	28
IL-12P40	29
MDC	30
IL-12P70	33
PDGF-AA	34
IL-13	35
PDGF-AB/BB	36
IL-15	37
sCD40L	38
IL-17A	39
IL-1RA	42
IL-1α	44
IL-9	45
IL-1β	46
IL-2	48
IL-3	51
IL-4	53
IL-5	55
IL-6	57
IL-7	61
IL-8	63
IP-10	65
MCP-1	67
MIP-1α	72
MIP-1β	73
RANTES	74
TNFα	75
TNFβ	76
VEGF	78

Quality Controls

The ranges for each analyte in Quality Control 1 and 2 are provided on the card insert or can be located at our website SigmaAldrich.com using the catalogue number as the keyword.

Assay Characteristics

Cross-Reactivity

There was no or negligible cross-reactivity between the antibodies and any of the other analytes in this panel.

Assay Sensitivities (minimum detectable concentrations, pg/mL)

Minimum Detectable Concentration (MinDC) is calculated using MILLIPLEX® Analyst 5.1. It measures the true limits of detection for an assay by mathematically determining what the empirical MinDC would be if an infinite number of standard concentrations were run for the assay under the same conditions.

Cytokine	MinDC (pg/mL)	MinDC+2SD (pg/mL)
EGF	2.8	4.6
FGF-2	7.6	11.8
Eotaxin	4.0	6.8
TGFα	0.8	1.2
G-CSF	1.8	3.3
Flt-3L	5.4	7.0
GM-CSF	7.5	15.0
Fractalkine	22.7	37.7
IFNα2	2.9	4.8
IFNγ	0.8	1.1
GRO	9.9	14.1
IL-10	1.1	1.6
MCP-3	3.8	6.4
IL-12P40	7.4	12.7
MDC	3.6	7.1
IL-12P70	0.6	1.0
IL-13	1.3	1.9
IL-15	1.2	1.7
sCD40L	5.1	9.9
IL-17	0.7	1.2
IL-1RA	8.3	17.1
IL-1α	9.4	12.6
IL-9	1.2	2.0
IL-1β	0.8	1.0
IL-2	1.0	1.6
IL-3	0.7	1.0
IL-4	4.5	7.1
IL-5	0.5	0.7
IL-6	0.9	1.3
IL-7	1.4	2.4
IL-8	0.4	0.7
IP-10	8.6	14.0
MCP-1	1.9	3.4
MIP-1α	2.9	6.2
MIP-1β	3.0	4.8
TNFα	0.7	1.1
TNFβ	1.5	1.9
VEGF	26.3	47.9
PDGF-AA	0.4	0.7
PDGFAB-BB	2.2	2.7
RANTES	1.2	1.9

Precision

Intra-assay precision is generated from the mean of the % CV's from sixteen reportable results across two different concentration of cytokines in a single assay. Inter-assay precision is generated from the mean of the % CV's from four reportable results across two different concentrations of cytokines across six different experiments.

Cytokine	Intra-assay %CV	Inter-assay %CV (N=6 assays)
EGF	2.3	5.8
FGF-2	2.3	4.8
Eotaxin	7.2	10.8
TGFα	4.1	9.5
G-CSF	1.8	15.5
Flt-3L	2.4	6.6
GM-CSF	3.1	10.1
Fractalkine	4.5	9.4
IFNα2	2.4	13.3
IFNγ	1.6	12.0
GRO	2.1	9.2
IL-10	1.6	16.8
MCP-3	1.6	6.4
IL-12P40	2.8	12.4
MDC	1.6	7.2
IL-12P70	2.2	16.7
IL-13	2.2	9.2
IL-15	2.7	8.1
sCD40L	3.7	18.9
IL-17	2.2	7.9
IL-1RA	2.1	10.7
IL-1α	3.3	12.8
IL-9	2.4	8.4
IL-1β	2.3	6.7
IL-2	2.1	6.3
IL-3	3.4	6.1
IL-4	2.9	14.2
IL-5	2.6	10.8
IL-6	2.0	18.3
IL-7	1.7	16.1
IL-8	1.9	3.5
IP-10	2.6	15.3
MCP-1	1.5	7.9
MIP-1α	1.9	14.5
MIP-1β	2.4	8.8
TNFα	2.6	13.0
TNFβ	1.6	11.4
VEGF	3.7	10.4
PDGF-AA	4.3	16.7
PDGFAB-BB	2.1	12.3
RANTES	1.9	5.0

Accuracy

Spike Recovery: The data represents mean recovery of three concentration levels (low, medium and high) of spiked standards in serum matrix.

Cytokine	% Recovery in matrix
EGF	97.5
FGF-2	99.0
Eotaxin	100.5
TGFα	91.7
G-CSF	100.3
Flt-3L	98.2
GM-CSF	100.7
Fractalkine	87.2
IFNα2	93.9
IFNγ	98.1
GRO	97.5
IL-10	97.7
MCP-3	97.0
IL-12P40	93.3
MDC	102.3
IL-12P70	104.0
IL-13	95.0
IL-15	95.3
sCD40L	95.2
IL-17A	103.8
IL-1RA	93.5
IL-1α	92.9
IL-9	99.4
IL-1β	94.9
IL-2	95.4
IL-3	101.0
IL-4	94.5
IL-5	99.9
IL-6	96.1
IL-7	93.0
IL-8	98.3
IP-10	93.8
MCP-1	98.3
MIP-1α	105.0
MIP-1β	92.4
TNFα	97.8
TNFβ	97.5
VEGF	91.8
PDGF-AA	97.9
PDGFAB-BB	102.0

Troubleshooting

Problem	Probable Cause	Solution
Insufficient Bead Count	Plate Washer aspirate height set too low	Adjust aspiration height according to manufacturers' instructions.
	Bead mix prepared inappropriately	Sonicate bead vials and vortex just prior to adding to bead mix bottle according to protocol. Agitate bead mix intermittently in reservoir while pipetting this into the plate.
	Samples cause interference due to particulate matter or viscosity	See above. Also sample probe may need to be cleaned with Alcohol flush, Back flush and washes; or if needed probe should be removed and sonicated.
	Probe height not adjusted correctly	When reading the assay on the Luminex® 200™ instrument, adjust probe height to the kit solid plate or to the recommended filter plates using 3 alignment discs. When reading the assay on the MAGPIX® instrument adjust probe height to the kit solid plate or to the recommended filter plates using 2 alignment discs. When reading the assay on the FLEXMAP 3D® instrument, adjust probe height to the kit solid plate using 1 alignment disc. For the FLEXMAP 3D® instrument, when using the solid plate in the kit, the final resuspension should be with 150 µL Sheath Fluid PLUS in each well and 75 µL should be aspirated. For the xMAP® INTELLIFLEX instrument, adjust probe height based on the type of plate you are using, place an alignment disk or an alignment sphere in the well according to the protocol recommended by Luminex®.
Background is too high	Background wells were contaminated	Avoid cross-well contamination by using sealer appropriately and pipetting with Multichannel pipets without touching reagent in plate.
	Matrix used has endogenous analyte or interference	Check matrix ingredients for cross reacting components (for example, interleukin modified tissue culture medium).
	Insufficient washes	Increase number of washes.

Problem	Probable Cause	Solution
Beads not in region or gate	Luminex® not calibrated correctly or recently	Calibrate Luminex® based on Instrument Manufacturer's instructions, at least once a week or if temperature has changed by > 3 °C.
	Gate Settings not adjusted correctly	Some Luminex® instruments (for example, Bioplex®) require different gate settings than those described in the Kit protocol. Use Instrument default settings.
	Wrong bead regions in protocol template	Check kit protocol for correct bead regions or analyte selection.
	Incorrect sample type used	Samples containing organic solvents or if highly viscous should be diluted or dialyzed as required.
	Instrument not washed or primed	Prime the Luminex® instrument 4 times to rid of air bubbles, wash 4 times with sheath fluid or water if there is any remnant alcohol or sanitizing liquid.
	Beads were exposed to light	Keep plate and bead mix covered with dark lid or aluminum foil during all incubation steps.
Signal for whole plate is same as background	Incorrect or no Detection Antibody was added	Add appropriate Detection Antibody and continue.
	Streptavidin-Phycoerythrin was not added	Add Streptavidin-Phycoerythrin according to protocol. If Detection Antibody has already been removed, sensitivity may be low.
Low signal for standard curve	Detection Antibody may have been removed prior to adding Streptavidin Phycoerythrin	May need to repeat assay if desired sensitivity not achieved.
	Incubations done at inappropriate temperatures, timings or agitation	Assay conditions need to be checked.
Signals too high, standard curves are saturated	Calibration target value set too high	With some Luminex® Instrument (for example, Bio-plex®) Default target setting for RP1 calibrator is set at High PMT. Use low target value for calibration and reanalyze plate.
	Plate incubation was too long with standard curve and samples	Use shorter incubation time.

Problem	Probable Cause	Solution
Sample readings are out of range	Samples contain no or below detectable levels of analyte	If below detectable levels, it may be possible to use higher sample volume. Check with tech support for appropriate protocol modifications.
	Samples contain analyte concentrations higher than highest standard point.	Samples may require dilution and reanalysis for just that particular analyte.
	Standard curve was saturated at higher end of curve.	See above.
High Variation in samples and/or standards	Multichannel pipet may not be calibrated	Calibrate pipets.
	Plate washing was not uniform	Confirm all reagents are removed completely in all wash steps.
	Samples may have high particulate matter or other interfering substances	See above.
	Plate agitation was insufficient	Plate should be agitated during all incubation steps using a vertical plate shaker at a speed where beads are in constant motion without causing splashing.
	Cross well contamination	Check when reusing plate sealer that no reagent has touched sealer. Care should be taken when using same pipet tips that are used for reagent additions and that pipet tip does not touch reagent in plate.

FOR FILTER PLATES ONLY

Problem	Probable Cause	Solution
Filter plate will not vacuum	Vacuum pressure is insufficient	Increase vacuum pressure such that 0.2 mL buffer can be suctioned in 3-5 seconds.
	Samples have insoluble particles	Centrifuge samples just prior to assay setup and use supernatant.
	High lipid concentration	After centrifugation, remove lipid layer and use supernatant.
Plate leaked	Vacuum Pressure too high	Adjust vacuum pressure such that 0.2 mL buffer can be suctioned in 3-5 seconds. May need to transfer contents to a new (blocked) plate and continue.
	Plate set directly on table or absorbent towels during incubations or reagent additions	Set plate on plate holder or raised edge so bottom of filter is not touching any surface.
	Insufficient blotting of filter plate bottom causing wicking	Blot the bottom of the filter plate well with absorbent towels after each wash step.
	Pipette touching plate filter during additions	Pipette to the side of plate.
	Probe height not adjusted correctly	Adjust probe to 3 alignment discs in well H6.
	Sample too viscous	May need to dilute sample.

Product Ordering

Replacement Reagents	Cat. No.
Human Cytokine/Chemokine Standard	MXH8060
Human Cytokine/Chemokine Standard	MXH8060-2
Human Cytokine Quality Controls 1 and 2	MXH6060
Human Cytokine Quality Controls 1 and 2	MXH6060-2
Human Cytokine Detection Antibodies	MXH1060-1
Human Cytokine Detection Antibodies	MXH1060-2
Human Cytokine Detection Antibodies	MXH1060-3
Human Cytokine Detection Antibodies	MXH1060-4
Serum Matrix	MXHSM
Bead Diluent	LBD
Assay Buffer	L-AB
Streptavidin-Phycoerythrin	L-SAPE9
Streptavidin-Phycoerythrin	L-SAPE3
Streptavidin-Phycoerythrin	L-SAPE10
Streptavidin-Phycoerythrin	L-SAPE11
Set of two 96-Well Black plates with sealers	MAG-PLATE
10X Wash Buffer	L-WB
Human Cytokine/Chemokine 29 Plex Premixed Magnetic Bead Panel – BULK PACKAGING	HCYTMAG60PMX29BK
Human Cytokine/Chemokine 30 Plex Premixed Magnetic Bead Panel – BULK PACKAGING	HCYTMAG60PMX30BK
Human Cytokine/Chemokine 38 Plex Premixed Magnetic Bead Panel – BULK PACKAGED	HCYTMAG60PMX38BK
Human Cytokine/Chemokine 41 Plex Premixed Magnetic Bead Panel – BULK PACKAGED	HCYTMAG60PMX41BK

Antibody-Immobilized Magnetic Beads

Analyte	Bead No.	Cat. No.
EGF	12	HEGF-MAG
FGF-2	13	HCYFGF2-MAG
Eotaxin	14	HETXN-MAG
TGF-α	15	HCYTGFA-MAG
G-CSF	18	HGCSF-MAG
Flt-3L	19	HFLT3L-MAG
GM-CSF	20	HGMCSF-MAG
Fractalkine	21	HFKN-MAG
IFNα2	22	HIFNA2-MAG
IFNγ	25	HCYIFNG-MAG
GRO	26	HGR0-MAG
IL-10	27	HCYIL10-MAG
MCP-3	28	HMCP3-MAG
IL-12P40	29	HIL12P40-MAG
MDC	30	HMDC-MAG
IL-12P70	33	HIL12P70-MAG
PDGF-AA	34	HPDGFAA-MAG
IL-13	35	HIL13-MAG
PDGF-AB/BB	36	HPDGFBB-MAG
IL-15	37	HIL15-MAG
sCD40L	38	HCD40L-MAG
IL-17A	39	HIL17-MAG
IL-1RA	42	HIL1RA-MAG
IL-1α	44	HIL1A-MAG
IL-9	45	HIL9-MAG
IL-1β	46	HCYIL1B-MAG
IL-2	48	HIL2-MAG
IL-3	51	HIL3-MAG
IL-4	53	HIL4-MAG
IL-5	55	HIL5-MAG
IL-6	57	HCYIL6-MAG
IL-7	61	HIL7-MAG
IL-8	63	HCYIL8-MAG
IP-10	65	HIP10-MAG
MCP-1	67	HCYMCP1-MAG
MIP-1α	72	HMIP1A-MAG
MIP-1β	73	HMIP1B-MAG
RANTES	74	HCYRNTS-MAG
TNFα	75	HCYTNFA-MAG
TNFβ	76	HTNFB-MAG
VEGF	78	HCYVEGF-MAG
Premixed 29 Plex Beads		HCYPMX29-MAG
Premixed 38 Plex Beads		HCYPMX38-MAG

Well Map

	1	2	3	4	5	6	7	8	9	10	11	12
A	0 pg/mL Standard (Background)	Standard 4	QC-2 Control									
B	0 pg/mL Standard (Background)	Standard 4	QC-2 Control									
C	Standard 1	Standard 5	Sample 1									
D	Standard 1	Standard 5	Sample 1									
E	Standard 2	Standard 6	Sample 2									
F	Standard 2	Standard 6	Sample 2									
G	Standard 3	QC-1 Control	Etc.									
H	Standard 3	QC-1 Control										

Notice

We provide information and advice to our customers on application technologies and regulatory matters to the best of our knowledge and ability, but without obligation or liability. Existing laws and regulations are to be observed in all cases by our customers. This also applies in respect to any rights of third parties. Our information and advice do not relieve our customers of their own responsibility for checking the suitability of our products for the envisaged purpose.

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Contact Information

For the location of the office nearest you, go to SigmaAldrich.com/offices.

Technical Assistance

Visit the tech service page at SigmaAldrich.com/techservice.

Standard Warranty

The applicable warranty for the products listed in this publication may be found at SigmaAldrich.com/terms.

Safety Data Sheets (SDS)

Safety Data Sheets are available on the product page at SigmaAldrich.com.