

Fluorokine[®] MAP

Rat MultiAnalyte Profiling Base Kit

Catalog Number LUR000

For the simultaneous quantitative determination of multiple rat cytokine concentrations in cell culture supernates, serum, and 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

Cytokines are intercellular signaling proteins released from a wide variety of cells and tissues. They play an integral role in regulating growth and cellular proliferation as well as modulating host response to infection, injury, and inflammation. Cytokines also influence reproduction and bone remodeling. A large number of cytokines are pleiotropic and share similar functions. In addition, many cytokines influence the production of other cytokines. Analysis and quantification of cytokines in biological fluids and cell culture supernates has thus become increasingly important. Methods such as bioassay, enzyme-linked immunosorbent assay (ELISA), intracellular staining, ribonuclease protection assay (RPA) and polymerase chain reaction (PCR) have all been used for quantifying cytokines; however, each of these techniques has limitations associated with it. These techniques are not capable of measuring multiple cytokines simultaneously in a limited sample volume.

Any combination of the following bead sets are suitable for use with this base kit.

Analyte	Catalog Number	Microparticle Region
CINC-2 α / β	LUR516	53
CINC-3	LUR525	54
GM-CSF	LUR518	17
ICAM-1/CD54	LUR583	75
IFN- γ	LUR585	80
IL-1 α /IL-1F1	LUR500	06
IL-1 β /IL-1F2	LUR501	21
IL-2	LUR502	61
IL-4	LUR504	19
IL-6	LUR506	10
IL-10	LUR522	26
IL-13	LUR1945	74
IL-18/IL-1F4	LUR521	18
L-Selectin/CD62L	LUR1534	34
TIMP-1	LUR580	33
TNF- α /TNFSF1A	LUR510	04
VEGF	LUR564	58

PRINCIPLE OF THE ASSAY

Fluorokine[®] MAP multiplex kits are designed for use with the Luminex[®] 100[™], Luminex 200[™], or Bio-Rad[®] Bio-Plex[®] dual laser, flow-based sorting and detection analyzers.

Analyte-specific antibodies are pre-coated onto color-coded microparticles. 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 antibodies, streptavidin-phycoerythrin conjugate (Streptavidin-PE), which binds to the captured biotinylated detection antibodies, is added to each well. A final wash removes unbound Streptavidin-PE. The microparticles are resuspended in buffer and read using the Luminex or Bio-Plex analyzer. One laser is microparticle-specific and determines which analyte is being detected. The other laser determines the magnitude of the phycoerythrin-derived signal, which is in direct proportion to the amount of analyte bound.

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 standard 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 soluble receptors, binding proteins, and other factors present in biological samples. However, until these proteins have been tested in Fluorokine MAP, the possibility of interference cannot be excluded.
- Fluorokine MAP affords the user the benefit of multianalyte analysis of cytokines in a single complex sample. 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 base kit.**

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.
- For best results, adjust the vacuum strength on the plate washer to between 15 and 40 cm of mercury.

MATERIALS PROVIDED & STORAGE CONDITIONS

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

PART	PART #	DESCRIPTION	STORAGE OF OPENED, DILUTED, OR RECONSTITUTED MATERIAL
Standard Cocktail	893115	2 vials of recombinant rat cytokines in a buffered protein base with preservatives; lyophilized.	Discard after use. Use a fresh standard for each assay.
Microparticle Diluent 4	895547	6 mL of a buffered protein base with preservatives.	May be stored for up to 1 month at 2-8 °C.* <i>Once diluted, any unused microparticle mixture must be discarded.</i>
Biotin Antibody Diluent 2	895832	5.5 mL of a buffered protein base with preservative.	May be stored for up to 1 month at 2-8 °C.*
Calibrator Diluent RD5K	895119	21 mL of a buffered protein base with preservatives. <i>For cell culture supernate samples.</i>	
Calibrator Diluent RD6-46	895883	21 mL of a buffered protein base with preservatives. <i>For serum/plasma samples.</i>	
Streptavidin-PE	892525	0.07 mL of a 100-fold concentrated streptavidin-phycoerythrin conjugate with preservatives.	
Wash Buffer Concentrate	895003	21 mL of a 25-fold concentrated solution of buffered surfactant with preservative.	
Microplate	640763	1 filter-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	749020	1 card listing the Standard reconstitution volume and working standard concentrations for this lot of base kit.	

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

OTHER SUPPLIES REQUIRED

- **Fluorokine MAP analyte-specific kit(s) (see page 1).**
- Luminex 100, Luminex 200, or Bio-Rad Bio-Plex analyzer with X-Y platform.
- Microplate vacuum manifold (Millipore Multiscreen™ Vacuum Manifold Catalog # MAVM096 or equivalent).
- 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 500 ± 50 rpm.
- Microcentrifuge.
- **Polypropylene** test tubes for dilution of standards and samples.

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.

SAMPLE PREPARATION

Serum and plasma samples require a 4-fold dilution. A suggested 4-fold dilution is 30 μ L of sample + 90 μ L of Calibrator Diluent RD6-46. Mix thoroughly.

For some analytes, a 2-fold initial dilution may be an option. See the analyte-specific insert for details.

REAGENT PREPARATION

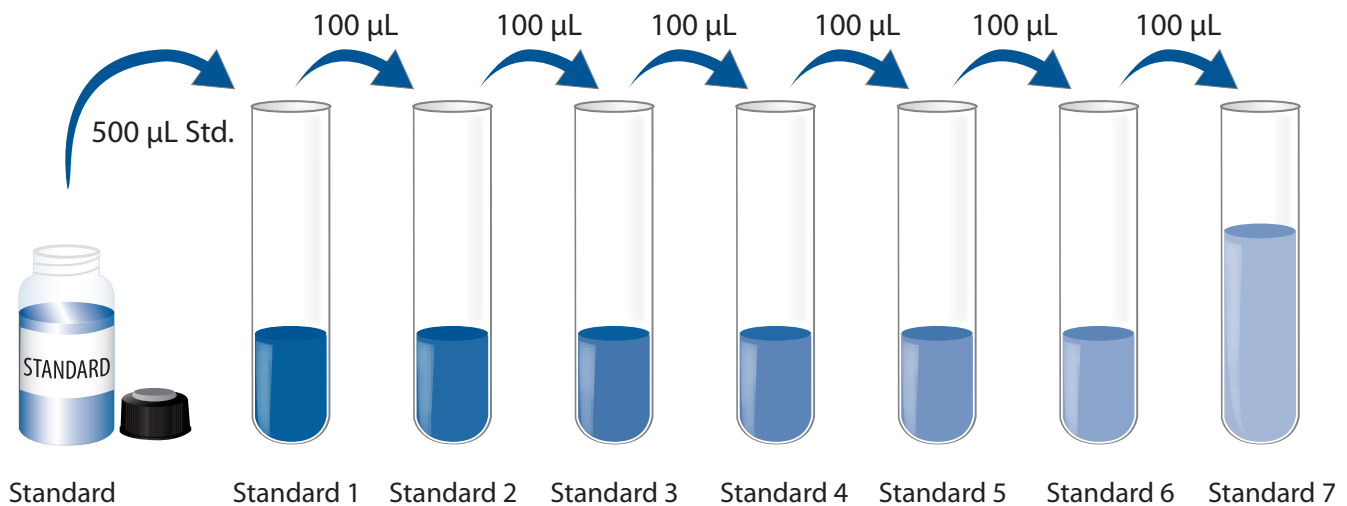
Bring all reagents to room temperature before use.

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

Calibrator Diluent RD5K (1X) - Add 20 mL of Calibrator Diluent RD5K Concentrate to 20 mL of deionized or distilled water to prepare 40 mL of Calibrator Diluent RD5K (1X).

Standard - Reconstitute the Standard Cocktail with Calibrator Diluent RD5K (1X) (*for cell culture supernate samples*) or Calibrator Diluent RD6-46 (*for serum/plasma samples*). Refer to the Standard Value Card for the reconstitution volume. Allow the standards to sit for a minimum of 15 minutes with gentle agitation prior to making dilutions.

Use polypropylene tubes. Pipette 500 μ L of the reconstituted Standard into the tube labeled Standard 1. Pipette 200 μ L of the appropriate Calibrator Diluent 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 appropriate Calibrator Diluent serves as the blank. Refer to the Standard Value Card for the assigned values of Standard 1.



DILUTED MICROPARTICLE COCKTAIL PREPARATION

1. Centrifuge each Microparticle Concentrate vial for 30 seconds at 1000 x g prior to removing the cap.
2. Gently vortex the vials to resuspend the microparticles, taking precautions not to invert the vials.
3. Dilute the Microparticle Concentrates in the mixing bottle provided. The volume of the Microparticle Concentrate listed in the table below is for each analyte (e.g. if measuring a full plate of IL-2 and IL-6, add 50 μ L of IL-2 Microparticle Concentrate and 50 μ L of IL-6 Microparticle Concentrate to 5 mL of Microparticle Diluent).

Number of Wells Used	Microparticle Concentrate	+	Microparticle Diluent
96	50.0 μ L	+	5.00 mL
72	37.5 μ L	+	3.75 mL
48	25.0 μ L	+	2.50 mL
24	12.5 μ L	+	1.25 mL

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. Centrifuge each Biotin Antibody Concentrate vial for 30 seconds at 1000 x g prior to removing the cap.
2. Gently vortex the vials, taking precautions not to invert the vials.
3. Add 50 μ L of each Biotin Antibody Concentrate to the vial of Biotin Antibody Diluent. Mix gently.

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 100X Streptavidin-PE to a 1X concentration by adding 55 μ L of Streptavidin-PE to 5.5 mL of Wash Buffer.

INSTRUMENT SETTINGS

Adjust the probe height setting on the Luminex analyzer to avoid puncturing the membrane. Refer to the instrument manual.

- a) Assign the bead region for each analyte being measured (see page 1)
- b) 50 events/bead
- c) Minimum events: 0
- d) Flow rate: 60 μ L/minute (fast)
- e) Sample size: 50 μ L
- f) Doublet Discriminator gates at approximately 7500 and 15,500
- g) Collect Median Fluorescence Intensity (MFI)

Note: For the Bio-Rad Bio-Plex analyzer, set the gates at 4300 and 10,000. The CAL2 setting for the Bio-Rad Bio-Plex analyzer should be set at the low RP1 target value.

ASSAY PROCEDURE

Bring all reagents and samples to room temperature before use. It is recommended that all samples and standards 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. Pre-wet the filter-bottomed microplate by filling each well with 100 μ L of Wash Buffer. Remove the liquid through the filter at the bottom of the plate using a vacuum manifold designed to accommodate a microplate.
Note: *After each final wash cycle and subsequent reagent addition, blot the bottom of the microplate with a paper towel to prevent wicking.*
3. Resuspend the diluted Microparticle Cocktail by inversion or vortexing. Add 50 μ L of the microparticle mixture to each well of the pre-wet filter-bottomed microplate.
4. Add 50 μ L of Standard or sample* per well. Pipet assay within 15 minutes. Securely cover with a foil plate sealer. Incubate for 3 hours at room temperature on a horizontal orbital microplate shaker (0.12" orbit) set at 500 ± 50 rpm. A plate layout is provided to record standards and samples assayed.
5. Using a vacuum manifold device designed to accommodate a microplate, wash by removing the liquid, filling each well with Wash Buffer (100 μ L) and removing the liquid again. All of the liquid must be removed through the filter at the bottom of the plate to avoid any loss of microparticles. Complete removal of liquid is essential for good performance. Perform the wash procedure three times.
6. Add 50 μ L of diluted Biotin Antibody Cocktail to each well. Securely cover with a foil plate sealer and incubate for 1 hour at room temperature on the shaker set at 500 ± 50 rpm.
7. Repeat the wash as in step 5.
8. Add 50 μ L of diluted Streptavidin-PE to each well. Securely cover with a foil plate sealer and incubate for 30 minutes at room temperature on the shaker set at 500 ± 50 rpm.
9. Repeat the wash as in step 5.
10. Resuspend the microparticles by adding 100 μ L of Wash Buffer to each well.
11. Read within 90 minutes using a Luminex or Bio-Rad Analyzer. **Immediately before reading, incubate for 2 minutes on the shaker set at 500 ± 50 rpm.**

*Serum/plasma 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 capable of generating a five parameter logistic (5-PL) curve-fit.

If 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 rat cytokines produced at R&D Systems.

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PLATE LAYOUT

Use this plate layout to record standards and samples assayed.

12									
11									
10									
9									
8									
7									
6									
5									
4									
3									
2									
1									
	A	B	C	D	E	F	G	H	

NOTES