



AlphaLISA[®] Human Matrix Metalloproteinase 13 (hMMP13) Detection Kit

Product number: AL318 HV/C/F

Research Use Only. Not for use in diagnostic procedures.

Product Information

- Application:** This kit is designed for the quantitative determination of human MMP13 in cell culture media, sera and plasma using a homogeneous AlphaLISA assay (no wash steps).
- Sensitivity:** Lower Detection Limit (LDL): 6.5 pg/mL
Lower Limit of Quantification (LLOQ): 20.5 pg/mL
- Dynamic range:** 6.5 – 100,000 pg/mL (Figure 1).

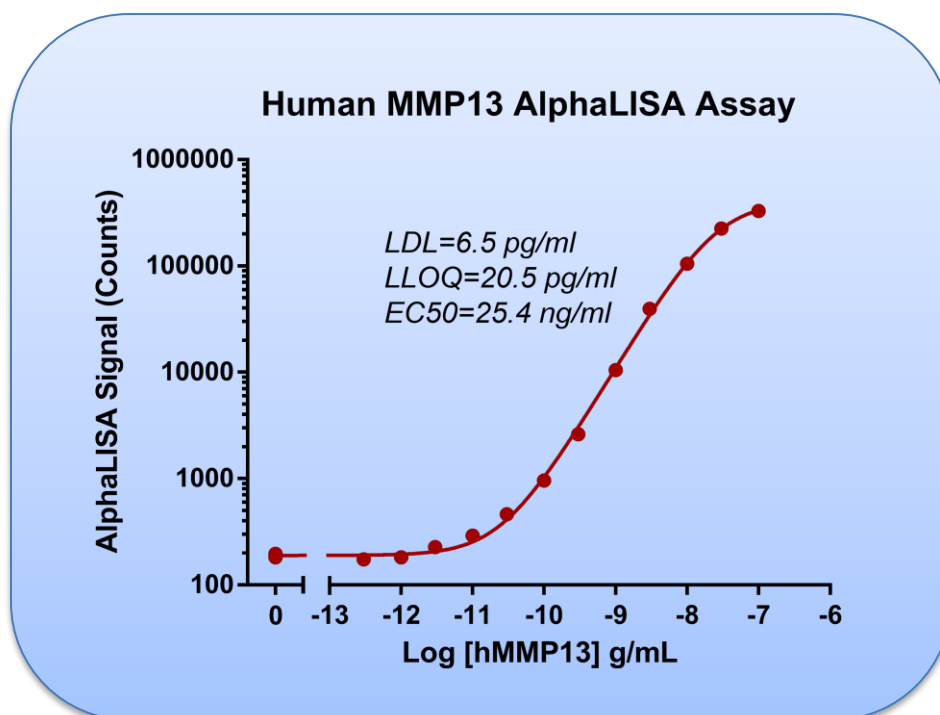


Figure. 1. Typical sensitivity curve in AlphaLISA Immunoassay buffer. The data was generated using a white Optiplate[™]-384 microplate and the EnVision[®] Multilabel Plate Reader with Alpha option 2102.

- Storage:** Store kit in the dark at +4°C. Store reconstituted analyte at -20°C.
- Stability:** This kit is stable for at least 6 months from the manufacturing date when stored in its original packaging and the recommended storage conditions.

Analyte of Interest

Matrix metalloproteinase 13 (MMP13, Collagenase 3), a member of the matrix metalloproteinase family, is an enzyme composed of a catalytic domain and a hemopexin-like domain, activated by cleavage of inactive pro-proteins by extracellular proteinases. MMP13 is involved in the breakdown of extracellular matrix in normal physiological processes, such as embryonic development, reproduction, and tissue remodeling, as well as in disease processes, such as arthritis and metastasis of cancer. This kit has been designed for the detection of Human MMP13 in serum, plasma, and cell culture supernatants.

Description of the AlphaLISA Assay

AlphaLISA technology allows the detection of molecules of interest in buffer, cell culture media, serum and plasma in a highly sensitive, quantitative, reproducible and user-friendly mode. In an AlphaLISA assay, a Biotinylated Anti-Analyte

Antibody binds to the Streptavidin-coated Donor beads while another Anti-Analyte Antibody is conjugated to AlphaLISA Acceptor beads. In the presence of the analyte, the beads come into close proximity. The excitation of the Donor beads provokes the release of singlet oxygen molecules that triggers a cascade of energy transfer in the Acceptor beads, resulting in a sharp peak of light emission at 615 nm (see figure below).

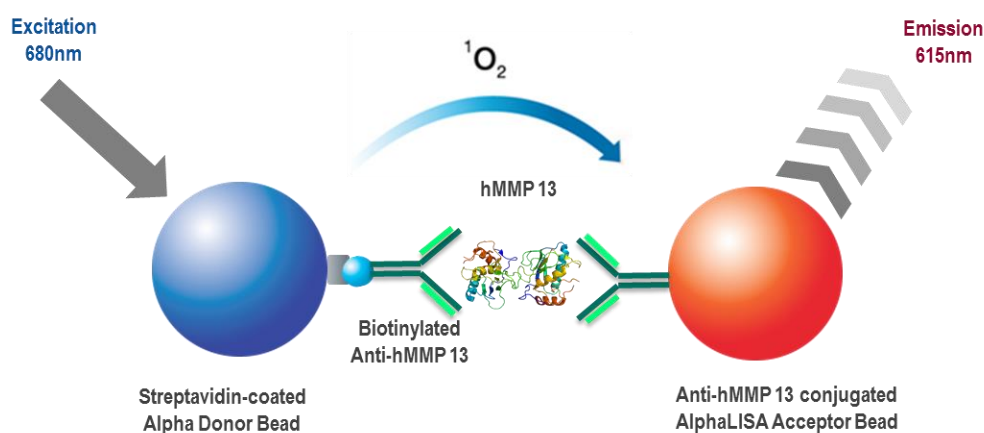


Figure 2. AlphaLISA Assay principle.

Precautions

- The AlphaScreen® Donor beads are light-sensitive. All the other assay reagents can be used under normal light conditions. All Alpha assays using the Donor beads should be performed under subdued laboratory lighting (< 100 lux). Green filters (LEE 090 filters (preferred) or Roscolux filters #389 from Rosco) can be applied to light fixtures.
- All blood components and biological materials should be handled as potentially hazardous.
- Some analytes are present in saliva. Take precautionary measures to avoid contamination of the reagent solutions.
- The Biotinylated Anti-Analyte Antibody contains sodium azide. Contact with skin or inhalation should be avoided.

Kit Content: Reagents and Materials

Kit components	AL318HV (100 assay points ^{***})	AL318C (500 assay points ^{***})	AL318F (5 000 assay points ^{***})
AlphaLISA Anti-Human MMP13 Acceptor beads stored in PBS, 0.05% Kathon, pH 7.2	20 µL @ 5 mg/mL (1 brown tube, <u>white</u> cap)	50 µL @ 5 mg/mL (1 brown tube, <u>white</u> cap)	500 µL @ 5 mg/mL (1 brown tube, <u>white</u> cap)
Streptavidin (SA)-coated Donor beads stored in 25 mM HEPES, 100 mM NaCl, 0.05% Kathon, pH 7.4	100 µL @ 5 mg/mL (1 brown tube, <u>black</u> cap)	200 µL @ 5 mg/mL (1 brown tube, <u>black</u> cap)	2 x 1 mL @ 5 mg/mL (2 brown tubes, <u>black</u> caps)
Biotinylated Antibody Anti-Human MMP13 stored in PBS, 0.1% Tween-20, 0.05% NaN ₃ , pH 7.4	20 µL @ 500 nM (1 tube, <u>black</u> cap)	50 µL @ 500 nM (1 tube, <u>black</u> cap)	500 µL @ 500 nM (1 tube, <u>black</u> cap)
Human MMP13 Analyte Lyophilized (0.1 µg)	1 tube, <u>clear</u> cap	1 tube, <u>clear</u> cap	1 tube, <u>clear</u> cap
AlphaLISA Immunoassay Buffer (10X) **	2 mL, 1 small bottle	10 mL, 1 small bottle	100 mL, 1 large bottle

* The thawed analyte should be used within 60 minutes or aliquoted into screw-capped polypropylene vials and stored at -20°C for further experiments. Avoid multiple freeze-thaw cycles. It has been demonstrated that the Human MMP13 analyte solution is stable for at least 6 months at -20°C. One vial contains an amount of Human MMP13 sufficient for performing 10 standard curves. Additional vials can be ordered separately (cat # AL318S).

** Contains 250 mM HEPES, pH 7.4, 1% Casein, 10 mg/mL Dextran-500, 5% Triton X-100 and 0.5% Kathon. Extra buffer can be ordered separately (cat # AL000C: 10 mL, cat # AL000F: 100 mL). Note: 10X buffer might be slightly yellow. However, this does not affect the assay results.

*** The number of assay points is based on an assay volume of 100 µL in 96-well plates (AL318HV) or 50 µL in 96- or 384-well assay plates using the kit components at the recommended concentrations.

Sodium azide should **not** be added to the stock reagents. High concentrations of sodium azide (> 0.001 % final in the assay) might decrease the AlphaLISA signal. Note that sodium azide from the Biotinylated Antibody stock solution will not interfere with the AlphaLISA signal (0.0001% final in the assay).

Specific additional required reagents and materials:

The following materials are recommended:

Item	Suggested source	Catalog #
TopSeal™-A Adhesive Sealing Film	Revvity Inc.	6050195
EnVision®-Alpha Reader	Revvity Inc.	-

Recommendations

- The volume indicated on each tube is guaranteed for single pipetting. Multiple pipetting of the reagents may reduce the theoretical amount left in the tube. To minimize loss when pipetting beads, it is preferable not to pre-wet the tip.
- Centrifuge all tubes (including lyophilized analyte) before use to improve recovery of content (2000g, 10-15 sec). Re-suspend all reagents by vortexing before use.
- Use Milli-Q® grade H₂O (18 MΩ•cm) to dilute 10X AlphaLISA Immunoassay Buffer to reconstitute the lyophilized analyte.
- When diluting the standard or samples, change tips between each standard or sample dilution. When loading reagents in the assay microplate, change tips between each standard or sample addition and after each set of reagents.
- When reagents are added to the microplate, make sure the liquids are at the bottom of the well.
- Small volumes may be prone to evaporation. It is recommended to cover microplates with TopSeal-A Adhesive Sealing Films to reduce evaporation during incubation. Microplates can be read with the TopSeal-A Film.
- The AlphaLISA signal is detected with an EnVision Multilabel Reader equipped with the Alpha option using the AlphaScreen standard settings (e.g. Total Measurement Time: 550 ms, Laser 680 nm Excitation Time: 180 ms, Mirror: D640as, Emission Filter: M570w, Center Wavelength 570 nm, Bandwidth 100 nm, Transmittance 75%).
- AlphaLISA signal will vary with temperature and incubation time. For consistent results, identical incubation times and temperature should be used for each plate.
- The standard curves shown in this technical data sheet are provided for information only. A standard curve must be generated for each experiment. The standard curve should be performed in a similar matrix as the samples (e.g. FBS for serum samples).

Assay Procedure

IMPORTANT: PLEASE READ THE RECOMMENDATIONS BELOW BEFORE USE

- The manual described below is an example for generating one standard curve in a 50 µL final assay volume (48 wells, triplicate determinations). The manuals also include testing samples in 452 wells. If a different amount of samples are tested, the volumes of all reagents have to be adjusted accordingly, as shown in the table below. These calculations do not include excess reagent to account for losses during transfer of solutions or dead volumes.
- The standard dilution manual is provided for information only. As needed, the number of replicates or the range of concentrations covered can be modified.
- Use of four background points in triplicate (12 wells) is recommended when LDL/LLOQ is calculated. One background point in triplicate (3 wells) can be used when LDL/LLOQ is not calculated.

		Volume				
Format	# of data points	Final	Sample	AlphaLISA beads / Biotin Antibody MIX	SA-Donor beads	Plate recommendation
HV	100	100 µL	10 µL	40 µL	50 µL	White OptiPlate-96 (cat # 6005290) White ½ AreaPlate-96 (cat # 6005560)
C	250	100 µL	10 µL	40 µL	50 µL	White OptiPlate-96 (cat # 6005290) White ½ AreaPlate-96 (cat # 6005560)
	500	50 µL	5 µL	20 µL	25 µL	White ½ AreaPlate-96 (cat # 6005560) White OptiPlate-384 (cat # 6007290) Light gray AlphaPlate™-384 (cat # 6005350)
	1 250	20 µL	2 µL	8 µL	10 µL	Light gray AlphaPlate-384 (cat # 6005350) ProxiPlate™-384 Plus (cat # 6008280) White OptiPlate-384 (cat # 6007290)
	2 500	10 µL	1 µL	4 µL	5 µL	Light gray AlphaPlate-1536 (cat # 6004350)
F	5 000	50 µL	5 µL	20 µL	25 µL	White ½ AreaPlate-96 (cat # 6005560) White OptiPlate-384 (cat # 6007290) Light gray AlphaPlate-384 (cat # 6005350)
	12 500	20 µL	2 µL	8 µL	10 µL	Light gray AlphaPlate-384 (cat # 6005350) ProxiPlate-384 Plus (cat # 6008280) White OptiPlate-384 (cat # 6007290)
	25 000	10 µL	1 µL	4 µL	5 µL	Light gray AlphaPlate-1536 (cat # 6004350)

Manual for hMMP13 AlphaLISA Assay

The Manual (2-Step Quick Manual) described below is for one standard curve (48 wells) and samples (452 wells). No significant improvement was observed when the 3-step manual was performed.

Steps for Preparing Reagents

If a different amount of samples are tested, the volumes of all reagents have to be adjusted accordingly.

- 1) Preparation of 1X AlphaLISA Immunoassay Buffer:
Add 2.5 mL of 10X AlphaLISA Immunoassay Buffer to 22.5 mL H₂O.
- 2) Preparation of hMMP13 analyte standard dilutions:
 - a) Reconstitute lyophilized hMMP13 (0.1 µg) in 100 µL of H₂O.
 - b) Prepare standard dilutions as follows in 1X AlphaLISA Immunoassay Buffer (change tip between each standard dilution):

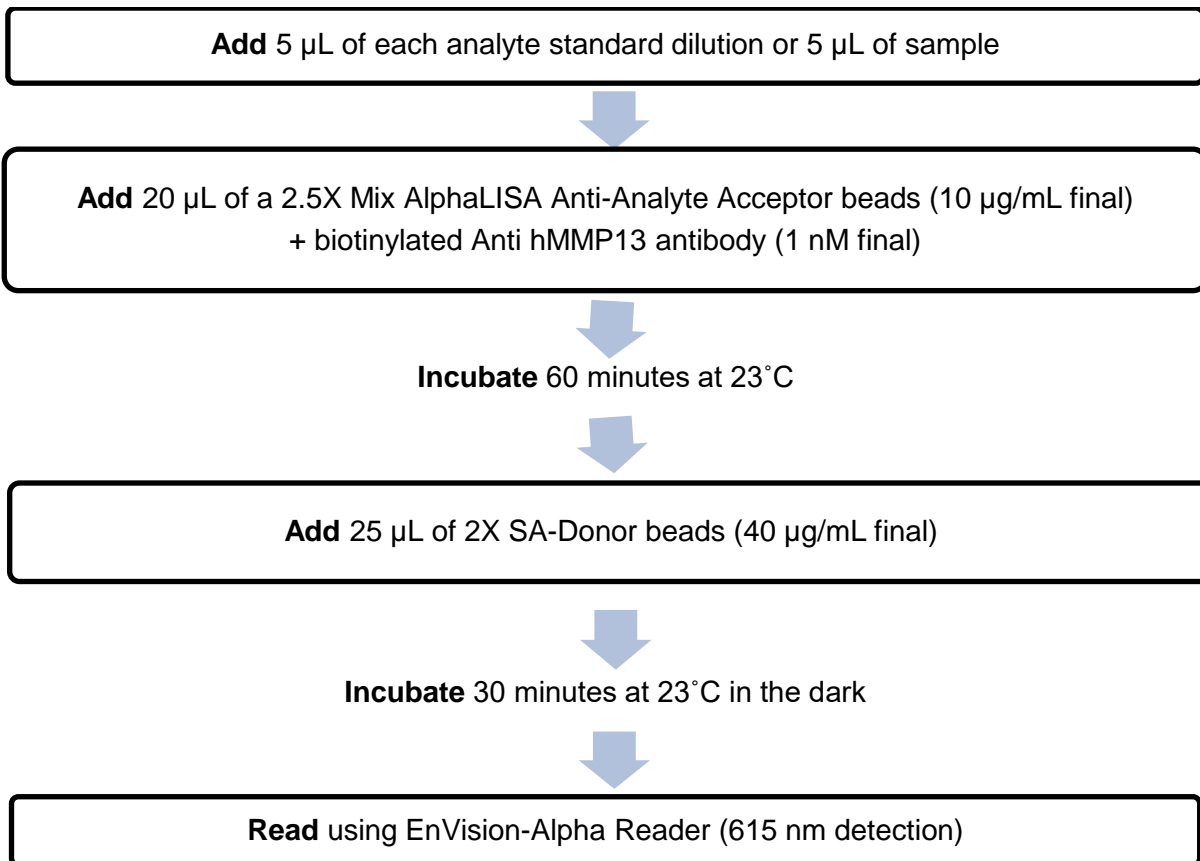
Tube	Vol. of hMMP13 (µL)	Vol. of diluent (µL) *	[hMMP13] in standard curve		Final [hMMP13] in well
			(g/mL in 5 µL)	(pg/mL in 5 µL)	(g/mL in 50 µL)
A	10 µL of provided hMMP13	90	1.00E-07	100000	1.00E-08
B	60 µL of tube A	140	3.00E-08	30000	3.00E-09
C	60 µL of tube B	120	1.00E-08	10000	1.00E-09
D	60 µL of tube C	140	3.00E-09	3000	3.00E-10
E	60 µL of tube D	120	1.00E-09	1000	1.00E-10
F	60 µL of tube E	140	3.00E-10	300	3.00E-11
G	60 µL of tube F	120	1.00E-10	100	1.00E-11
H	60 µL of tube G	140	3.00E-11	30	3.00E-12
I	60 µL of tube H	120	1.00E-11	10	1.00E-12
J	60 µL of tube I	140	3.00E-12	3	3.00E-13
K	60 µL of tube J	120	1.00E-12	1	1.00E-13
L	60 µL of tube K	140	3.00E-13	0.3	3.00E-14
M ** (background)	0	100	0	0	0
N ** (background)	0	100	0	0	0
O ** (background)	0	100	0	0	0
P ** (background)	0	100	0	0	0

* Dilute standards in diluent (e.g. 1X AlphaLISA Immunoassay Buffer).
At low concentrations of analyte, a significant amount of analyte can bind to the vial. Therefore, load the analyte standard dilutions in the assay microplate within 60 minutes of preparation.

** Four background points in triplicate (12 wells) are used when LDL is calculated. If LDL does not need to be calculated, one background point in triplicate can be used (3 wells).

- 3) Preparation of 2.5X MIX AlphaLISA Anti-hMMP13 Acceptor beads (25 µg/mL) + biotinylated Anti hMMP13 Antibody (2.5nM):
 - a. Add 50 µL of 5 mg/mL AlphaLISA Anti hMMP13 Acceptor beads and 50 µL of 500nM Anti hMMP13 Antibody to 9900 µL of 1X AlphaLISA Immunoassay Buffer.
 - b. Prepare just before use.

- 4) Preparation of 2X Streptavidin (SA) Donor beads (80 µg/mL):
- Keep the beads under subdued laboratory lighting.
 - Add 200 µL of 5 mg/mL SA-Donor beads to 12300 µL of 1X AlphaLISA Immunoassay Buffer.
 - Prepare just before use.
- 5) In a white Optiplate (384 wells):



Data Analysis

- Calculate the average count value for the background wells.
- Generate a standard curve by plotting the AlphaLISA counts versus the concentration of analyte. A log scale can be used for either or both axes. No additional data transformation is required.
- Analyze data according to a nonlinear regression using the 4-parameter logistic equation (sigmoidal dose-response curve with variable slope) and a $1/Y^2$ data weighting (the values at maximal concentrations of analyte after the hook point should be removed for correct analysis).
- The LDL is calculated by interpolating the average background counts (12 wells without analyte) + 3 x standard deviation value (average background counts + (3xSD)) on the standard curve.
- The LLOQ as measured here is calculated by interpolating the average background counts (12 wells without analyte) + 10 x standard deviation value (average background counts + (10xSD)) on the standard curve. Alternatively, the true LLOQ can be determined by spiking known concentrations of analyte in the matrix and measuring the percent recovery, and then determining the minimal amount of spiked analyte that can be quantified within a given limit (usually +/- 20% or 30% of the real concentration).
- Read from the standard curve the concentration of analyte contained in the samples.
- If samples have been diluted, the concentration read from the standard curve must be multiplied by the dilution factor.

Assay Performance Characteristics

AlphaLISA assay performance described below was determined using the 2-Step Quick Manual.

Sensitivity:

The LDL and LLOQ were calculated as described above. The values correspond to the lowest concentration of analyte that can be detected in a volume of 5 μ L using the recommended assay conditions.

LDL (pg/mL)	LLOQ (pg/mL)	Buffer/Media used	# of experiments
6.6	20.5	AlphaLISA Immunoassay Buffer	9

* Note that LDL/ LLOQ can be decreased (i.e. sensitivity increased) by increasing the volume of analyte in the assay (e.g. use 10 μ L of analyte in a final assay volume of 50 μ L).

Assay precision:

The following assay precision data were calculated from the five independent assays using two different kit lots. In each lot, the analytes were prepared in AlphaLISA Immunoassay Buffer (IAB). Each assay consisted of one standard curve comprising 12 data points (each in triplicate) and 12 background wells (no analytes). The assays were performed in 384-well format using AlphaLISA Immunoassay Buffer.

- Intra-assay precision:

The intra-assay precision was determined using a total of 5 independent determinations in triplicate. Shown CV%.

Human MMP13	AlphaLISA Immunoassay Buffer
100 ng/mL	3.8%
10 pg/mL	5.1%

- Inter-assay precision:

The inter-assay precision was determined using a total of 9 independent determinations.

Human MMP13	AlphaLISA Immunoassay Buffer
100 ng/mL	8.7%
10 pg/mL	14.6%

- Spike Recovery:

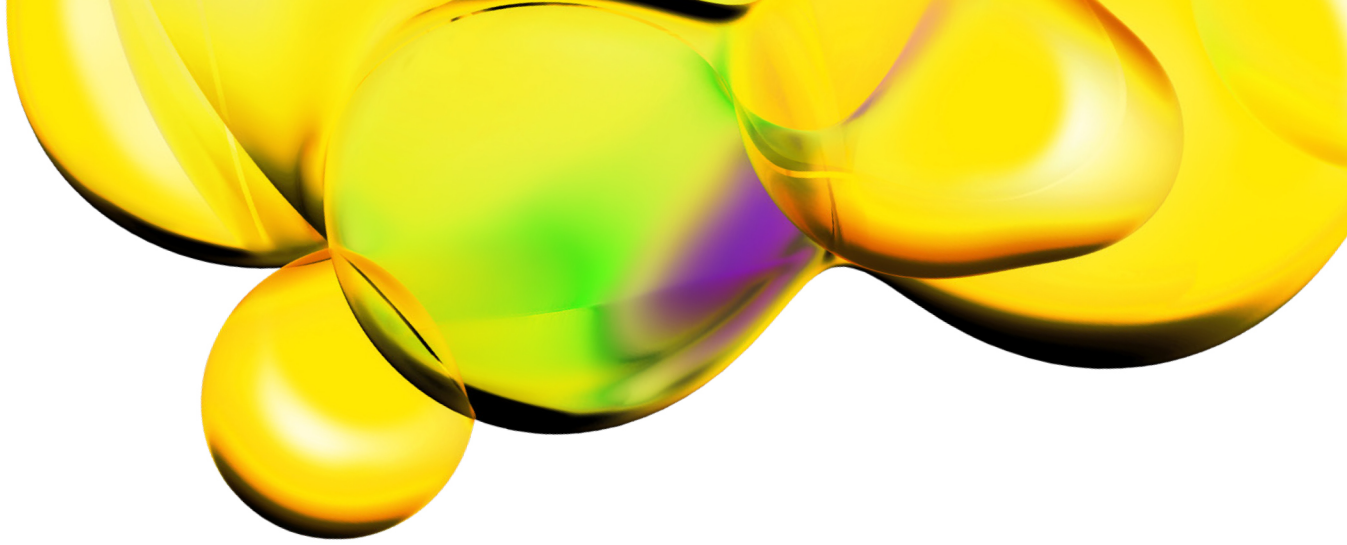
Three known concentrations of analyte were spiked into cell culture media containing 10% FBS, 10% Human Serum and AlphaLISA Immunoassay Buffer (IAB). All samples were run alongside a standard curve diluted in AlphaLISA Immunoassay Buffer; this standard curve was used to interpolate the concentrations of the samples. The percent recovery is defined as assay measured concentration with respect to the spiked concentration.

Spike (Human MMP13 ng/mL)	% Recovery			
	IAB	RPMI+10%FBS	DMEM+10%FBS	10% Human Serum
30	112	123	111	102
3	101	104	97	118
0.3	91	98	104	88

Troubleshooting Guide

You will find detailed recommendations for common situations you might encounter with your AlphaLISA Assay kit at: www.revivity.com

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