

Mouse Immunoglobulin G subtype 2a (IgG_{2a} isotyping) AlphaLISA Immunoassay Kit

Product number: AL523 (HV, C, F)

Caution: For Laboratory Use. A research product for research purposes only.

Lot specific kit information can be found at www.perkinelmer.com/COA

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Product Information

Application: This kit is designed for the quantitative determination of mouse IgG_{2a} in cell culture media, using a homogeneous AlphaLISA assay (no wash steps). The assay shows negligible cross-reactivity with other mouse Ig isotypes.

Sensitivity: Lower Detection Limit (LDL): 23 pg/mL
Lower Limit of Quantification (LLOQ): 84 pg/mL
EC₅₀: 106 ng/mL
Min/Max counts: 743/ 249696 counts

Dynamic range: 23 - 1 000 000 pg/mL (Figure 1).

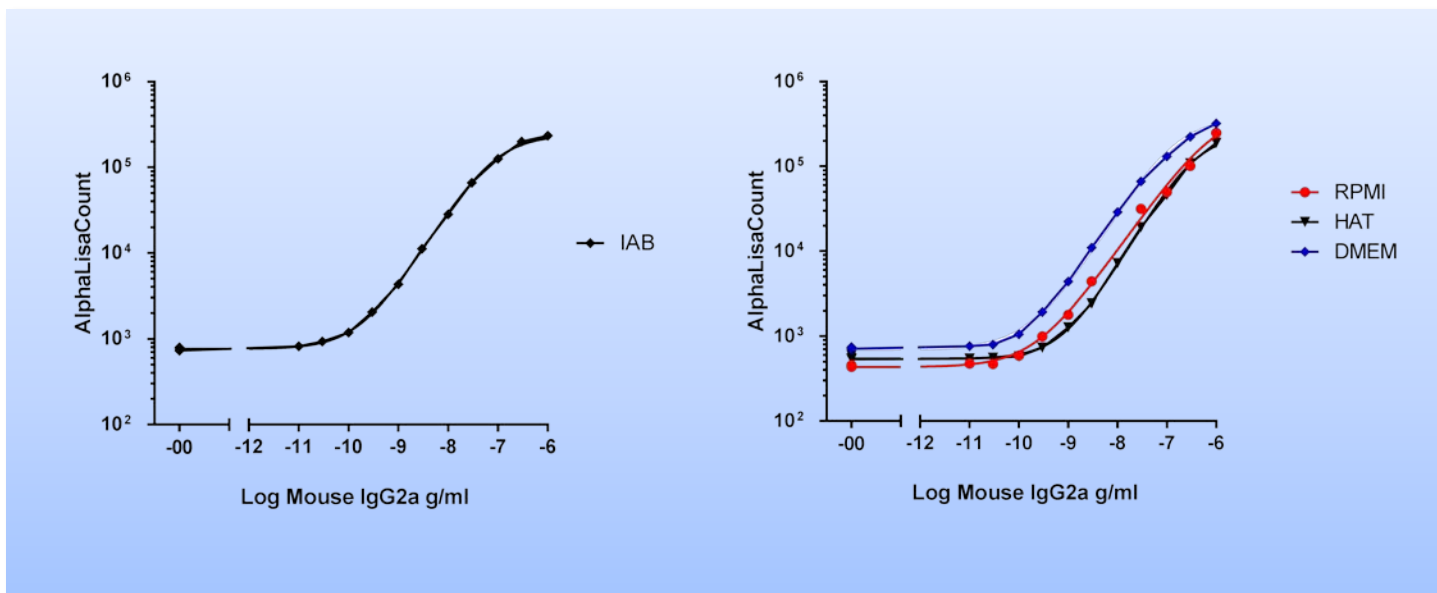


Figure. 1. Typical sensitivity curves in AlphaLISA buffer (left) and culture media (right). The data was generated using a white Optiplate™-384 microplate and the EnVision® Multilabel Plate Reader with Alpha option 2102.

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. Note: Once reconstituted, the mouse IgG_{2a} analyte is stable for at least 6 months when stored at -20°C.

Quality Control

Lot to lot consistency is confirmed in an AlphaLISA assay. Maximum and minimum signals, EC₅₀ and LDL were measured on the EnVision Multilabel Plate Reader with Alpha option using the protocol described in this technical data sheet. We certify that these results meet our quality release criteria. Maximum counts may vary between bead lots and the instrument used, with no impact on LDL measurement.

Analyte of Interest

There are five classes of mammalian immunoglobulins: IgA, IgD, IgE, IgM, and IgG. IgG is the most abundant immunoglobulin and is equally distributed in blood and tissue. In mice, the IgG class is further divided into four subclasses: IgG₁, IgG_{2a}/ IgG_{2c} (strain specific), IgG_{2b}, and IgG₃. The general immunoglobulin structure is composed of four polypeptide chains, two heavy and two light chains linked together and to each other by disulfide bonds, creating a tetrameric quaternary structure. IgG is involved in response to a foreign antigen. The presence of IgG usually signifies a mature antibody response. IgG has a molecular weight of about 150 kDa, it can bind to many pathogens and also plays an important role in antibody-dependent cell-mediated cytotoxicity. Typically mouse serum and plasma samples contain about 7 to 10 mg/ml of IgG. The present kit permits detection of mouse IgG_{2a} (i.e. analyte) in different sample matrices, including different cell culture media.

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 Alpha 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 (Figure 2).

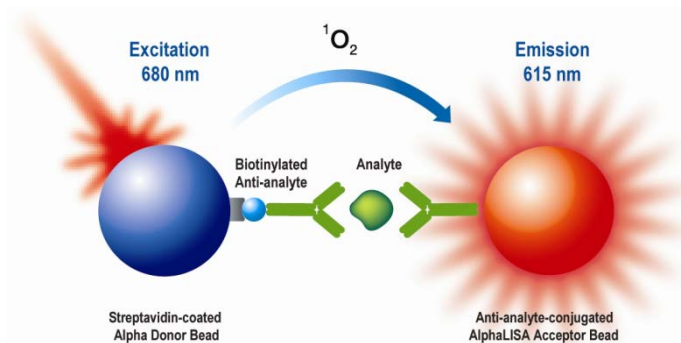


Figure 2. AlphaLISA Assay principle.

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	AL523HV (100 assay points ^{***})	AL523C (500 assay points ^{***})	AL523F (5 000 assay points ^{***})
AlphaLISA Anti-IgG _{2a} Acceptor beads stored in PBS, 0.05% Proclin-300, 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% Proclin-300, 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)	2000 µL @ 5 mg/mL (2 brown tube, <u>black</u> caps)
Biotinylated Antibody Anti-IgG _{2a} 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)
AlphaLISA mouse IgG _{2a} (3 µg), lyophilized analyte *	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

* Reconstitute mouse IgG_{2a} in 100 µL Milli-Q[®] grade H₂O. The reconstituted 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 reconstituted mouse IgG_{2a} is stable for at least 6 months at -20°C. One vial contains an amount of mouse IgG_{2a} sufficient for performing 10 standard curves. Additional vials can be ordered separately (cat # AL523S).

** Extra buffer can be ordered separately (cat # AL000C: 10 mL, cat # AL000F: 100 mL).

*** The number of assay points is based on an assay volume of 100 µL in 96-well plates (AL523HV) 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	PerkinElmer Inc.	6050195
EnVision®-Alpha Reader	PerkinElmer 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).
- AlphaLISA assays can be performed in cell culture medium with or without phenol red, with the following recommendations: if possible, avoid biotin-containing medium (e.g. RPMI medium) as lower counts and lower sensitivity are expected. Add at least 1% FBS or 0.1% BSA to cell culture medium.

Assay Procedure

IMPORTANT: PLEASE READ THE RECOMMENDATIONS BELOW BEFORE USE

- The protocol described below is an example for generating one standard curve in a 50 µL final assay volume (48 wells, triplicate determinations). The protocols 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 protocol 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.

Format	# of data points	Volume				Plate recommendation
		Final	Sample	AlphaLISA beads / Biotin Antibody MIX	SA-Donor beads	
AL523HV	100	100 µL	10 µL	40 µL	50 µL	White OptiPlate-96 (cat # 6005290) White ½ AreaPlate-96 (cat # 6005560)
AL523C	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)
AL523F	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)

Standard protocol (2 incubation steps) – Dilution of standards in 1X AlphaLISA ImmunoAssay Buffer or cell culture medium

The protocol described below is recommended when generating one standard curve in a 50 µL final assay volume (48 wells, triplicate determinations with manual pipetting). *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 1 mL of 10X AlphaLISA ImmunoAssay Buffer to 9 mL H₂O.

2) Preparation of mouse IgG_{2a} analyte standard dilutions:

- Reconstitute lyophilized mouse IgG_{2a} (3 µg) in 100 µL H₂O.
- Prepare standard dilutions as follows (change tip between each standard dilution) in 1X AlphaLISA ImmunoAssay Buffer or cell culture medium:

Tube	Vol. of Mouse IgG _{2a} (µL)	Vol. of diluent (µL) *	[mouse IgG _{2a}] in standard curve
			(pg/mL in 5 µL)
A	10 µL of reconstituted Mouse IgG _{2a}	90	3 000 000
B	60 µL of tube A	140	1 000 000
C	60 µL of tube B	120	300 000
D	60 µL of tube C	140	100 000
E	60 µL of tube D	120	30 000
F	60 µL of tube E	140	10 000
G	60 µL of tube F	120	3 000
H	60 µL of tube G	140	1 000
I	60 µL of tube H	120	300
J	60 µL of tube I	140	100
K	60 µL of tube J	120	30
L	60 µL of tube K	100	10
M ** (background)	0	100	0
N ** (background)	0	100	0
O ** (background)	0	100	0
P ** (background)	0	100	0

* Dilute standards in diluent (e.g. 1X AlphaLISA ImmunoAssay Buffer, cell culture medium).

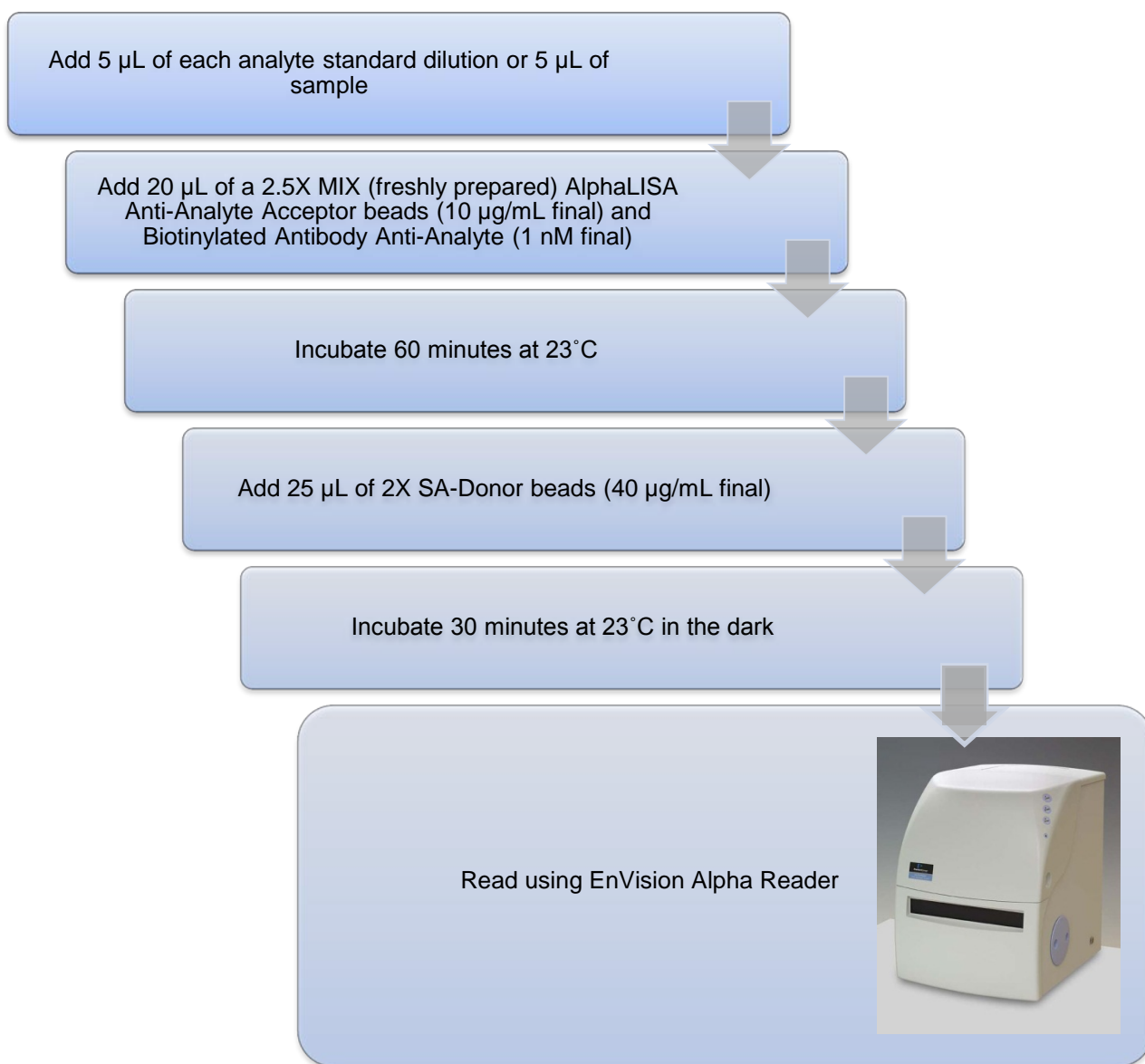
At low concentrations of analyte, a significant amount of analyte can bind to the vial. Therefore, load the analyte standard dilutions in the assay microplate within 60 minutes of preparation.

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

3) Preparation of 2.5X AlphaLISA Anti-IgG_{2a} Acceptor beads + 2.5X Biotinylated Anti-IgG_{2a} Antibody (25 µg/mL / 2.5 nM):

Add 15 µL of 5 mg/mL AlphaLISA Anti-IgG_{2a} Acceptor beads and add 15 µL of Biotinylated Anti-IgG_{2a} Antibody to 2970 µL of 1X AlphaLISA ImmunoAssay Buffer. Prepare just before use.

- 4) Preparation of 2X Streptavidin (SA) Donor beads (80 µg/mL): Keep the beads under subdued laboratory lighting. Add 48 µL of 5 mg/mL SA-Donor beads to 2952 µL of 1X AlphaLISA ImmunoAssay Buffer.
- 5) Samples:
 - If applicable, dilute samples to be tested in diluent (e.g. 1X AlphaLISA ImmunoAssay Buffer or cell culture medium).
- 6) In a 96- or 384-well microplate:



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 quick protocol.

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
23	84	AlphaLISA ImmunoAssay Buffer	6
24	84	DMEM+ 10% FBS	6
134	444	HAT + 10% FBS	6
47	180	RPMI + 10% FBS	6

- * 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 three independent assays using two different kit lots. In each lot, the analytes were prepared in AlphaLISA ImmunoAssay Buffer (IAB), DMEM, HAT, or RPMI. 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 6 independent determinations in triplicate. Shown CV%.

Mouse IgG _{2a} (pg/ml)	IAB	DMEM	HAT	RPMI
All points in the dilution	7%	4%	5%	8%

- Inter-assay precision:

The inter-assay precision was determined using a total of 6 independent determinations.

Mouse IgG _{2a} (pg/ml)	Buffer	DMEM	HAT	RPMI
3000000	12%	9%	6%	10%

- Recovery:

Three known concentrations of analyte were spiked in a cell culture media containing 10% FBS and AlphaLISA ImmunoAssay Buffer (IAB). All samples, including non-spiked culture media and AlphaLISA ImmunoAssay Buffer were measured in the assay. The percent recovery is defined as assay measured concentration with respect to the spiked concentration. The average recovery from two independent measurements is reported.

Spike (IgG _{2a} ng/mL)	% Recovery			
	AlphaLISA ImmunoAssay Buffer	DMEM	HAT	RPMI
1	100	97	65	95
10	99	104	75	84
100	100.7	94	78	111

- Specificity:

Cross-reactivity of the AlphaLISA IgG_{2a} Kit was tested using the following proteins at 0.1 µg/mL in AlphaLISA ImmunoAssay Buffer.

Protein	% Cross-reactivity
Mouse IgG ₁	0.03
Mouse IgG _{2b}	0.31
Mouse IgG ₃	0.21
Mouse IgE	0.00
Mouse IgA	0.00
Mouse IgM	0.00
Mouse IgD	0.86

Troubleshooting Guide

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

http://www.perkinelmer.com/in/resources/technicalresources/applicationsupportknowledgebase/alphalisa-alphascreen-no-washassays/alpha_troubleshoot.xhtml

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PerkinElmer, Inc.
940 Winter Street
Waltham, MA 02451 USA
P: (800) 762-4000 or
(+1) 203-925-4602
www.perkinelmer.com



For a complete listing of our global offices, visit www.perkinelmer.com/ContactUs

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