MANUAL

AlphaLISA® Human TGF- β1 Biotin-Free Detection Kit

Product number: AL361HV/C/F

Research Use Only. Not for use in diagnostic procedures.

Product Information

Application: This kit is designed for the quantitative determination of Human TGF-β1 (hTGF-β1) in cell culture supernatants using a homogeneous AlphaLISA assay (no wash steps). The kit utilizes a Digoxigenin (DIG)/ Anti-DIG interaction as opposed to the traditional Streptavidin/Biotin interaction. This enables optimal performance when working with biotin-rich media (e.g. RPMI) or samples containing endogenous biotin (e.g. milk, brain extracts).

Sensitivity: Lower Detection Limit (LDL): 9.2 pg/mL

Lower Limit of Quantification (LLOQ): 28.9 pg/mL

EC_{50}: 22 ng/mL

Dynamic range: 9.2 – 300 000 pg/mL (Figure 1).

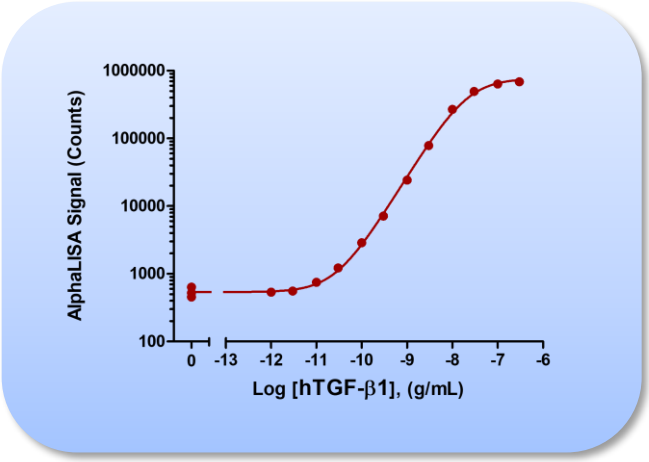


Figure1. Typical sensitivity curves in AlphaLISA Simple Immunoassay Buffer. The data was generated using a white Optiplate™-384 microplate and the EnVision® Multilabel Plate Reader with Alpha option 2103.

Storage: Store kit in the dark at +4˚C. Store reconstituted analyte at -20°C.

Stability: This kit is stable for at least 12 months from the manufacturing date when stored in its original packaging and the recommended storage conditions. Note: Once reconstituted, the hTGF-β1 analyte is stable for at least 18 months when stored at -20°C.

Analyte of Interest

Transforming growth factor beta 1 or TGF-β1, part of the TGF β cytokine superfamily, is a 25 kD disulfide-linked homodimer. TGF-β1 is produced by many cell types including immune cells and controls cell growth, proliferation, differentiation, and apoptosis by modulating many other cytokines and cytokine receptors. Serum and urine concentrations of TGF β1 are a useful marker for determining the status of patients with diabetic nephropathy in type II. The present kit permits the detection of hTGF-β1 (i.e. analyte) in human 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 this AlphaLISA assay, a DIG-labeled Anti-Analyte Antibody binds to the anti-DIG 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).

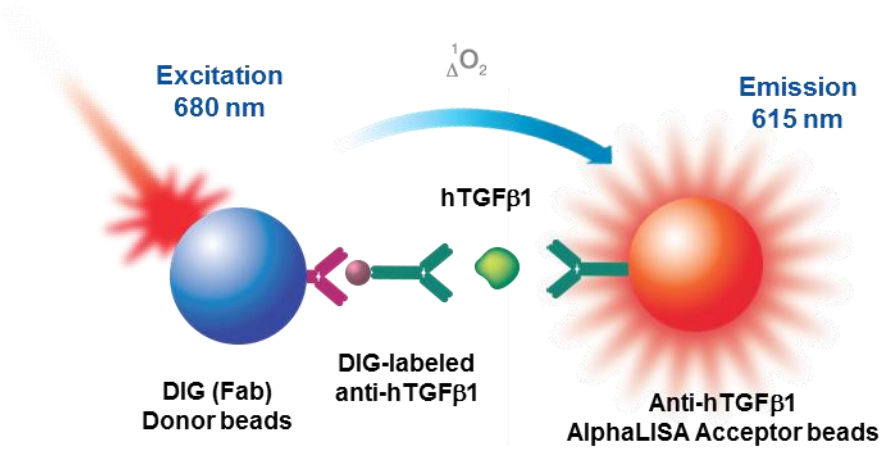


Figure 2. AlphaLISA Assay principle.

Precautions

- Anti-Digoxigenin Fab Fragment 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. The analyte included in this kit is from a Mouse source.
- Some analytes are present in saliva. Take precautionary measures to avoid contamination of the reagent solutions.
- The DIG labeled anti-analyte antibody is toxic. Contact with skin or inhalation should be avoided.

Kit Content: Reagents and Materials

Kit components	AL361HV (100 assay points***)	AL361C (500 assay points***)	AL361F (5000 assay points***)
AlphaLISA Anti- hTGF-β1 Acceptor beads stored in PBS, 0.05% Kathon, pH 7.2	15 µL @ 5 mg/mL (1 brown tube, white cap)	25 µL @ 5 mg/mL (1 brown tube, white cap)	250 µL @ 5 mg/mL (1 brown tube, white cap)
Anti-Digoxigenin Fab Fragment Donor beads stored in 25 mM HEPES, 100 mM NaCl, 0.05% Kathon, pH 7.4	100 µL @ 5 mg/mL (1 brown tube, black cap)	200 µL @ 5 mg/mL (1 brown tube, black cap)	2 x 1 mL @ 5 mg/mL (2 brown tubes, black caps)
DIG labeled Anti- hTGF-β1 stored in PBS, 0.1% Tween-20, 0.05% NaN_3, pH 7.4	20 µL @ 500 nM (1 tube, black cap)	50 µL @ 500 nM (1 tube, black cap)	500 µL @ 500 nM (1 tube, black cap)
AlphaLISA hTGF-β1 lyophilized Analyte*	0.3 µg 1 tube, clear cap	0.3 µg 1 tube, clear cap	0.3 µg 1 tube, clear cap
AlphaLISA Simple Immunoassay Buffer**	2 mL, 1 small bottle	10 mL, 1 medium bottle	100 mL, 1 large bottle

Reconstitute hTGF-β1 in 100 µL Milli-Q® grade H_2O. 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 hTGF-β1 is stable for at least 6 months at -20°C. One vial contains an amount of hTGF-β1 sufficient for performing 10 standard curves. Additional vials can be ordered separately (cat # AL336S).

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 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.

Specific additional required reagents and materials:

The following materials are recommended:

Item	Suggested source	Catalog #
TopSeal™-A Adhesive Sealing Film	Revvity Inc.	6050185
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 H_2O (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 the Immunoassay buffer for serum and/or plasma 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**	**Acceptor Beads**	**DIG-Antibody**	**Donor beads**	**Plate recommendation**
AL361HV	100	100 µL	10 µL	10 µL	10 µL	70 µL	White OptiPlate-96 (cat # 6005290) White ½ AreaPlate-96 (cat # 6005560)
AL 361C	250	100 µL	10 µL	10 µL	10 µL	70 µL	White OptiPlate-96 (cat # 6005290) White ½ AreaPlate-96 (cat # 6005560)
	500	50 µL	5 µL	5 µL	5 µL	35 µL	White ½ AreaPlate-96 (cat # 6005560) White OptiPlate-384 (cat # 6007290) Light gray AlphaPlate™-384 (cat # 6005350)
	1 250	20 µL	2 µL	2 µL	2 µL	14 µL	Light gray AlphaPlate-384 (cat # 6005350) ProxiPlate™-384 Plus (cat # 6008280) White OptiPlate-384 (cat # 6007290)
	2 500	10 µL	1 µL	1 µL	1 µL	7 µL	Light gray AlphaPlate-1536 (cat # 6004350)
A361F	5 000	50 µL	5 µL	5 µL	5 µL	35 µL	White ½ AreaPlate-96 (cat # 6005560) White OptiPlate-384 (cat # 6007290) Light gray AlphaPlate-384 (cat # 6005350)
	12 500	20 µL	2 µL	2 µL	2 µL	14 µL	Light gray AlphaPlate-384 (cat # 6005350) ProxiPlate-384 Plus (cat # 6008280) White OptiPlate-384 (cat # 6007290)
	25 000	10 µL	1 µL	1 µL	1 µL	7 µL	Light gray AlphaPlate-1536 (cat # 6004350)

High Concentration 3-step manual described below is for 500 assay points including one standard curve (48 wells) and samples (452 wells).
If a different amount of samples are tested, the volumes of all reagents have to be adjusted accordingly.

1) Preparation of 1X AlphaLISA Simple Immunoassay Buffer:
Add 5 mL of 10X AlphaLISA Simple Immunoassay Buffer to 45 mL H_2O.

2) Preparation of hTGF-β1 analyte standard dilutions:

   a) Reconstitute lyophilized hTGF-β1 (0.3 µg) in 100 µL of H_2O.
   b) Prepare standard dilutions as follows in 1X AlphaLISA Simple Immunoassay Buffer (change tip between each standard dilution):

Tube	Vol. of hTGF-β1 (µL)	Vol. of diluent (µL) *	[hTGF-β1] in standard curve	
			(g/mL in 5 µL)	(pg/mL in 5 µL)
A	10 µL of provided hTGF-β1	90	3.00E-07	300 000
B	60 µL of tube A	120	1.00E-07	100 000
C	60 µL of tube B	140	3.00E-08	30 000
D	60 µL of tube C	120	1.00E-08	10 000
E	60 µL of tube D	140	3.00E-09	3 000
F	60 µL of tube E	120	1.00E-09	1 000
G	60 µL of tube F	140	3.00E-10	300
H	60 µL of tube G	120	1.00E-10	100
I	60 µL of tube H	140	3.00E-11	30
J	60 µL of tube I	120	1.00E-11	10
K	60 µL of tube J	140	3.00E-12	3
L	60 µL of tube K	120	1.00E-12	1
M ** (background)	0	100	0	0
N ** (background)	0	100	0	0
O ** (background)	0	100	0	0
P ** (background)	0	100	0	0

Dilute standards in diluent (e.g. 1X AlphaLISA Simple 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.

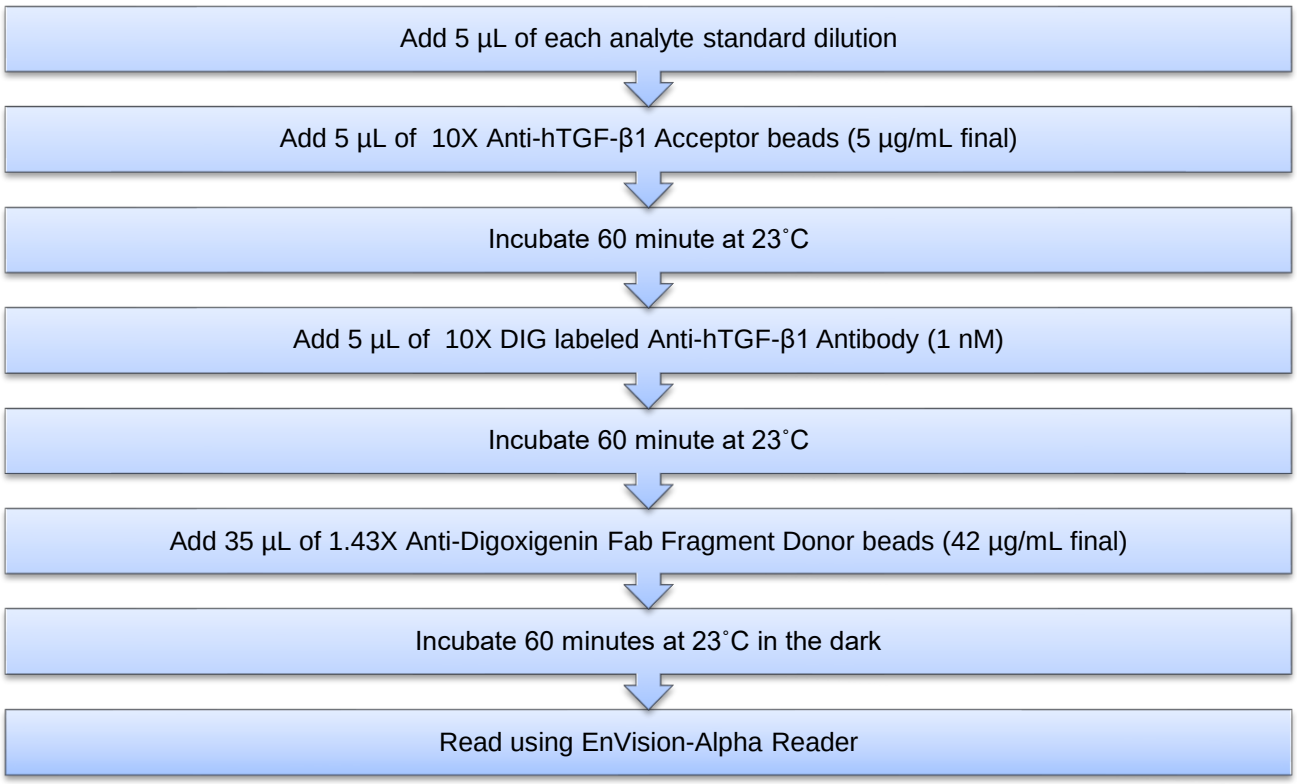
Four background points in triplicate (12 wells) are used when LDL is calculated. If LDL does not need to be calculated, one background point in triplicate can be used (3 wells).

3) Preparation of 10X AlphaLISA Anti-hTGF-β1 Antibody Acceptor beads (50 µg/mL):
   a. Add 25 µL of 5 mg/mL AlphaLISA Anti-hTGF-β1 Antibody Acceptor to 2475 µL of 1X AlphaLISA Simple Immunoassay Buffer.
   b. Prepare just before use.

4) Preparation of 10X DIG labeled Anti-hTGF-β1 Antibody (10 nM):
   a. Add 50 µL of 500 nM DIG labeled Anti-hTGF-β1 Antibody to 2450 µL of 1X AlphaLISA Simple Immunoassay Buffer.
   b. Prepare just before use.

5) Preparation of 1.43X Anti-Digoxigenin Fab Fragment Donor beads (60 µg/mL):
   a. Keep the beads under subdued laboratory lighting.
   b. Add 210 µL of 5 mg/mL Anti-Digoxigenin Fab Fragment Donor beads to 17290 µL of 1X AlphaLISA Simple Immunoassay Buffer.
   c. Prepare just before use.

6) 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) + 3x 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.

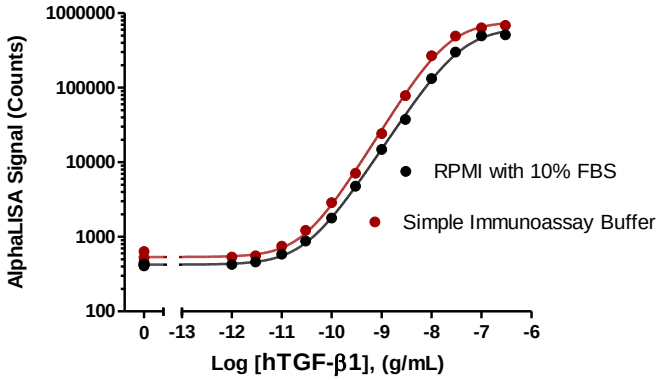
Assay Performance Characteristics

AlphaLISA assay performance described below was determined using the High Concentration 3-step manual.

- Assay Sensitivity:

The LDL was calculated as described above. The values correspond to the lowest concentration of analyte that can be detected in a volume of 5 µL using the recommended assay conditions.

LDL (pg/mL)	Buffer/Media	# of experiments
9.2	Simple Immunoassay Buffer	8
7.3	RPMI with 10% FBS	9



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

- 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 Simple Immunoassay Buffer, 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 Simple Immunoassay Buffer.

- Intra-assay precision:

The intra-assay precision was determined using 3 independent experiments for a total of 16 independent determinations in triplicate. CV% were calculated for each individual experiment then averaged. Shown is the average intra-experimental CV%.

hTGF-β1	Simple Immunoassay Buffer	RPMI
CV%	5%	6%

- Inter-assay precision:

The inter-assay precision was determined using the data across 3 independent experiments with 16 measurements in triplicate. CV% was calculated by comparing the same measurement in each experiment. The CV% for all 16 measurements was then averaged. Shown is the inter-experimental CV%.

hTGF-β1	Simple Immunoassay Buffer	RPMI
CV%	10%	10%

- Spike Recovery:

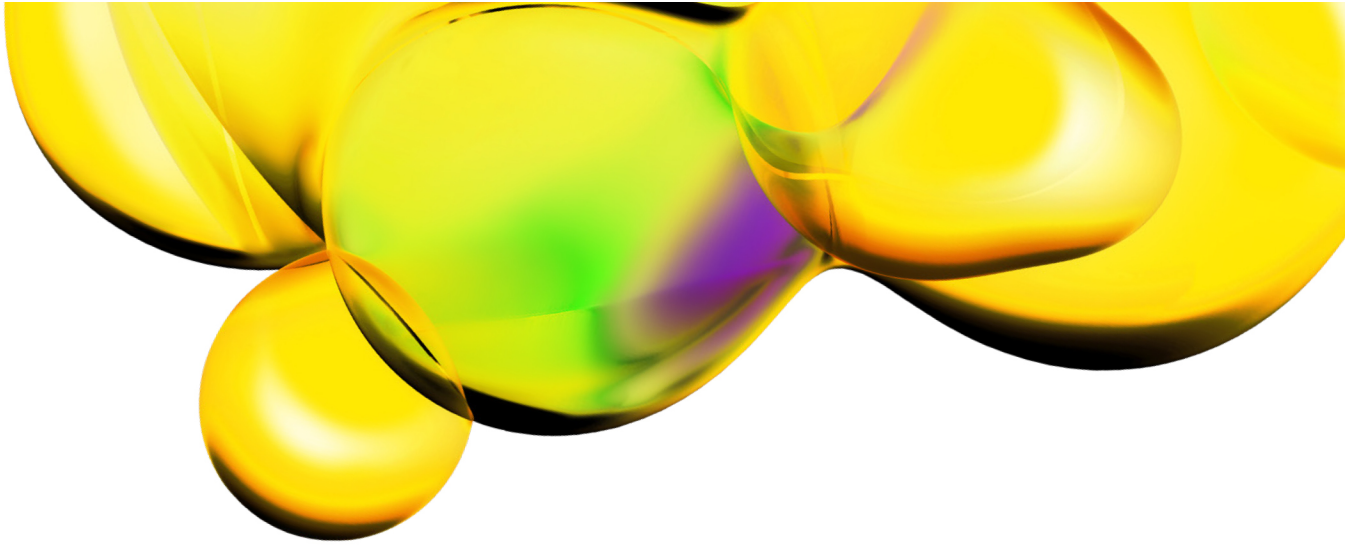
Four known concentrations of analyte were spiked in Simple Immunoassay Buffer and cell culture media containing 10% FBS. The spiked samples were referenced to the analyte curve produced in Simple Immunoassay Buffers and culture media.

Spiked hTGF-β1 (ng/mL)	% Recovery	
	Simple Immunoassay Buffer	RPMI
10	101	100
3	85	85
1	85	86
0.3	89	89

Troubleshooting Guide

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

RESEARCH USE ONLY. NOT FOR USE IN DIAGNOSTIC PROCEDURES



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