BioLegend®

Enabling Legendary Discovery™

LEGEND MAX™

ELISA Kit

Human IL-23

Cat. No. 437607

ELISA Kit for Accurate Quantitation of Human IL-23 from Cell Culture Supernatant, Serum, Plasma and Other Biological Fluids

BioLegend, Inc.
biolegend.com

It is highly recommended that this manual be read in its entirety before using this product. Do not use this kit beyond the expiration date.

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Introduction:

IL-23 (Interleukin-23 p19/p40) is a heterodimeric cytokine composed of two disulfide-linked subunits, a p19 subunit that is unique to IL-23, and a p40 subunit that is shared with IL-12. IL-23 is secreted by activated macrophages and dendritic cells. Human and mouse p19 share 70% amino acid sequence identity. IL-23 has been shown to enhance IFN-γ production by memory T cells. IL-23 is upregulated in certain autoimmune diseases and promotes immunity in response to some viral and mycobacterial infections. The protein is implicated in inflammatory diseases such as rheumatoid arthritis and Crohn's disease.

BioLegend's LEGEND MAX™ Human IL-23 ELISA Kit is a Sandwich Enzyme-Linked Immunosorbent Assay (ELISA) with a 96-well strip plate that is pre-coated with a mouse monoclonal anti-human IL-23 p19 antibody. the detection antibody is a biotinylated mouse monoclonal anti-human IL-23 p40 antibody. This kit is specifically designed for the accurate quantitation of human IL-23 from cell culture supernatant, serum, plasma and other biological fluids. This kit is analytically validated with ready-to-use reagents.

Materials Provided:

Description	Quantity	Volume (per bottle)	Part #
Anti-Human IL-23 Pre-coated 96-well Strip Microplate	1 plate		75274
Human IL-23 Detection Antibody	1 bottle	12 mL	78880
Human IL-23 Standard	1 vial	lyophilized	78885
Avidin-HRP	1 bottle	12 mL	77897
Assay Buffer A	1 bottle	25 mL	78232
Wash Buffer (20X)	1 bottle	50 mL	78233
Substrate Solution F	1 bottle	12 mL	76335
Stop Solution	1 bottle	12 mL	79133
Plate Sealers	1 pack		78101

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Materials to be Provided by the End-User:

- Microplate reader able to measure absorbance at 450 nm
- Adjustable pipettes to measure volumes ranging from 1 µL to 1,000 µL
- Deionized water
- Wash bottle or automated microplate washer
- Log-Log graph paper or software for data analysis
- Polypropylene tubes to prepare standard dilutions
- Timer
- Plate Shaker
- Polypropylene vials

Storage Information:

Store unopened kit components between 2°C and 8°C. Do not use this kit beyond its expiration date.

<table>
<tr><th colspan="2">Opened or Reconstituted Components</th></tr>
<tr><td>Microplate wells</td><td>If not all microplate strips are used, remove the excess strips by pressing up from underneath each strip. Place excess strips back in the foil pouch with the included desiccant pack and reseal. Store between 2°C and 8°C for up to one month.</td></tr>
<tr><td>Standard</td><td>The remaining reconstituted standard stock solution can be aliquoted into polypropylene vials and stored at -70°C for up to one month. Avoid repeated freeze-thaw cycles.</td></tr>
<tr><td>Detection Antibody</td><td rowspan="6">Store opened reagents between 2°C and 8°C and use within one month.</td></tr>
<tr><td>Avidin-HRP</td></tr>
<tr><td>Assay Buffer A</td></tr>
<tr><td>Wash Buffer (20X)</td></tr>
<tr><td>Substrate Solution F</td></tr>
<tr><td>Stop Solution</td></tr>
</table>

Health Hazard Warnings:

1. Reagents that contain preservatives may be harmful if ingested, inhaled or absorbed through the skin. Refer to the MSDS online at BioLegend's website for details (www.biolegend.com/msds).
2. Substrate Solution F is harmful if inhaled or ingested. Avoid skin, eye and clothing contact.

3. To reduce the likelihood of blood-borne transmission of infectious agents, handle all serum, plasma and other biological fluids in accordance with NCCLS regulations.
4. Stop Solution contains strong acid. *Wear eye, hand, and face protection.*
5. Before disposing the plate, rinse with an excess amount of tap water.

Specimen Collection and Handling:

Specimens should be clear and non-hemolyzed. If possible, unknown samples should be run at a number of dilutions to determine the optimal dilution factor that will ensure accurate quantitation.

Cell Culture Supernatant: If necessary, centrifuge all samples to remove debris prior to analysis. It is recommended that samples be stored at < -70°C. Avoid repeated freeze-thaw cycles.

Serum: Use a serum separator tube and allow clotting for at least 30 minutes, then centrifuge for 10 minutes at 1,000 x *g*. Remove serum layer and assay immediately or store serum samples at < -70°C. Avoid repeated freeze-thaw cycles.

Plasma: Collect blood samples in citrate, heparin or EDTA containing tubes. Centrifuge for 10 minutes at 1,000 x *g* within 30 minutes of collection. Assay immediately or store plasma samples at < -70°C. Avoid repeated freeze-thaw cycles.

Reagent and Sample Preparation:

Note: All reagents should be diluted immediately prior to use.

1. Dilute the 20X Wash Buffer to 1X with deionized water. For example, make 1 liter of 1X Wash Buffer by adding 50 mL of 20X Wash Buffer to 950 mL of deionized water. If crystals have formed in the 20X Wash Buffer, bring to room temperature and vortex until dissolved.
2. Reconstitute the lyophilized Human IL-23 Standard by adding the volume of Assay Buffer A to make the 20 ng/mL standard stock solution (Refer to LEGEND MAX Kit Lot-Specific Certificate of Analysis/LEGEND MAX Kit Protocol). Allow the reconstituted standard to sit at room temperature for 15 minutes, then briefly vortex to mix completely.
3. In general, samples are analyzed without dilutions. However, if dilutions are required, use Assay Diluent A as the sample diluent.

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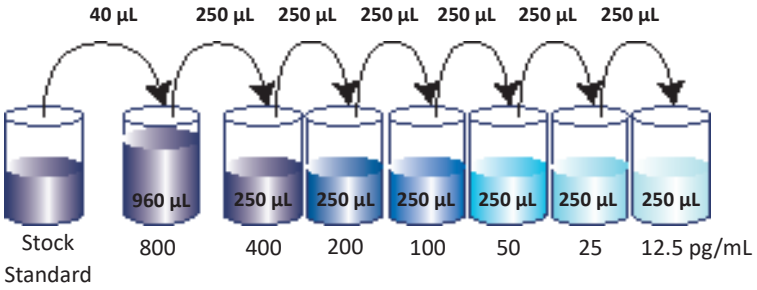
Assay Procedure:

Note: Do not mix reagents from different kits or lots. Reagents and/or antibodies from different manufacturers should not be used with this kit.

1. Bring all reagents to room temperature prior to use. It is strongly recommended that all standards and samples be run in duplicate or triplicate. A standard curve is required for each assay.
2. If not all microplate strips will be used, remove the excess strips by pressing up from underneath each strip. Place excess strips back in the foil pouch with the included desiccant pack and reseal.
3. Prepare 1000 µL of the 800 pg/mL top standard by adding 40 µL of the standard stock solution in 960 µL of Assay Buffer A. Perform six two-fold serial dilutions of the 800 pg/mL top standard in separate tubes using Assay Buffer A as the diluent. Thus, the human IL-23 standard concentrations in the tubes are 800 pg/mL, 400 pg/mL, 200 pg/mL, 100 pg/mL, 50 pg/mL, 25 pg/mL, and 12.5 pg/mL, respectively. Assay Buffer A serves as the zero standard (0 pg/mL).



4. Wash the plate 4 times with at least 300 µL of 1X Wash Buffer per well and blot any residual buffer by firmly tapping the plate upside down on absorbent paper. All subsequent washes should be performed similarly.
5. Add 50 µL of Assay Buffer A to each well that will contain either the standard dilutions or samples.
6. Add 50 µL of standard dilutions or samples to the appropriate wells.
7. Seal the plate with a Plate Sealer included in the kit. Shake the plate for 1 minute and incubate the plate overnight between 2°C and 8°C without shaking .
8. Discard the contents of the plate into a sink, then wash the plate 4 times with 1X Wash Buffer as in step 4.

9. Add 100 µL of Human IL-23 Detection Antibody solution to each well, seal the plate and incubate at room temerature for 1 hour with shaking.

10. Discard the contents of the plate into a sink, then wash the plate 4 times with 1X Wash Buffer as in step 4.

11. Add 100 µL of Avidin-HRP solution to each well, seal and incubate the plate at room temperature for 30 minutes with shaking.

12. Discard the contents of the plate into a sink, then wash the plates 5 times with 1X Wash Buffer as in step 4. For this final wash, soak wells in 1X Wash Buffer for 30 seconds to 1 minute for each wash. This will help to minimize background.

13. Add 100 µL of Substrate Soulution F to each well and incubate at room temperature for 20 minutes in the dark. Wells containing human IL-23 should turn blue in color with an intensity proportional to its concentration. It is not necessary to seal the plate during this step.

14. Stop the reaction by adding 100 µL of Stop Solution to each well. The solution color should change from blue to yellow.

15. Read absorbance at 450 nm within 30 minutes. If the reader is capable of reading at 570 nm, the absorbance at 570 nm can be subtracted from the absorbance at 450 nm.

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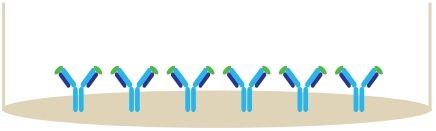
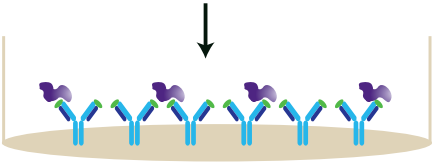
Assay Procedure Summary

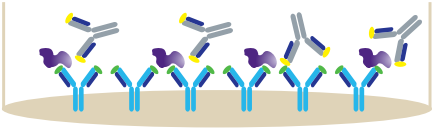
1. Wash 4 times.
   Add 50 µL Assay Buffer A to standard wells and sample wells



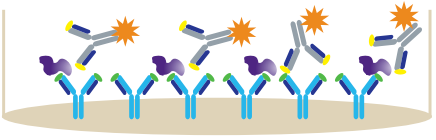
2. Add 50 µL diluted standards or samples, shake for 1 min and incubate overnight between 2°C and 8°C without shaking



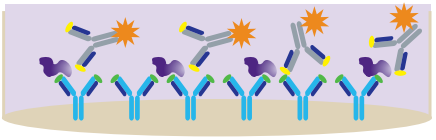
3. Wash 4 times
   Add 100 µL Detection Antibody solution
   Incubate 1 hr, RT, shaking



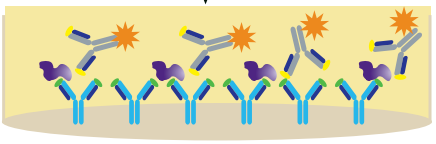
4. Wash 4 times
   Add 100 µL Avidin-HRP solution
   Incubate 30 min, RT, shaking



5. Wash 5 times
   Add 100 µL Substrate Solution F
   Incubate 20 min, RT, in the dark



6. Add 100 µL Stop Solution



7. Read absorbance at 450 nm and 570 nm

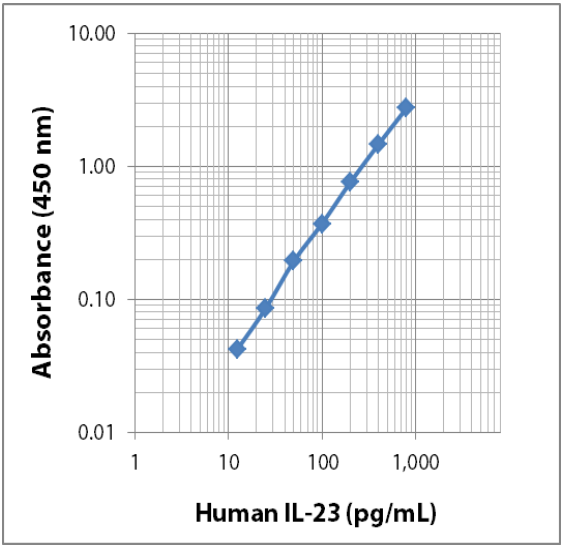
Calculation of Results:

The data can be best calculated with computer-based curve-fitting software using a 5- or 4-parameter logistics curve-fitting algorithm. If an appropriate software is not available, use log-log graph paper to determine sample concentrations. Determine the mean absorbance for each set of duplicate or triplicate standards, controls, and samples. Plot the standard curve on log-log graph paper with cytokine concentration on the X-axis and absorbance on the Y-axis. Draw a best fit line through the standard points. To determine the unknown cytokine concentrations, find the mean absorbance value of the unknown concentration on the Y-axis and draw a horizontal line to the standard curve. At the point of intersection, draw a vertical line to the X-axis and read the protein concentration.

If samples were diluted, multiply the concentration by the appropriate dilution factor. If a test sample's absorbance value falls outside the linear portion of the standard curve, the test sample needs to be re-analyzed at a higher (or lower) dilution as appropriate.

Typical Data:

This standard curve was generated at BioLegend for demonstration purposes only. A standard curve must be run with each assay.



Performance Characteristics:

Specificity: No cross reactivity was observed when this kit was used to analyze the following recombinant cytokines/chemokines, each tested at up to 50 ng/mL.

Human	IL-1α, IL-1 β, IL-1R, IL-2, IL-6, IL-7, IL-8, IL-12 (p40), IL-12 (p70), IL-12 (p80), IL-13, IL-15, IL-17A, IL-17F, IL-17A/F, IL-21, IL-22, IL-34, IFN-γ, GM-CSF, TNF-α, TSLP
Mouse	IL-12 (p40), IL-12 (p70), IL-17A, IL-17F, IL-17A/F, IL-23

Sensitivity: The average minimum detectable concentration is 2.45 pg/mL (n=8).

Recovery: Recombinant human IL-23 at concentrations of 400, 100, and 25 pg/mL, was spiked into the following human samples, then analyzed with the LEGEND MAX™ Human IL-23 ELISA Kit.

Sample Type	N	% Recovery
Serum	5	91
EDTA Plasma	5	100
Heparin Plasma	5	87
Citrate Plasma	5	97

Linearity: Recombinant human IL-23 was spiked into human serum and plasma samples to produce samples within the dynamic range, and then assayed with the kit to determine the dilutional linearity up to 8-fold dilutions.

Sample Type	N	% Linearity
Serum	5	104
EDTA Plasma	5	102
Heparin Plasma	5	97
Citrate Plasma	5	86

Intra-Assay Precision: Two serum samples were spiked with different recombinant human IL-23 concentrations and tested with 16 replicates in one assay.

Concentration	Sample 1	Sample 2
Number of Replicates	16	16
Mean Concentration (pg/mL)	361.5	22.7
Standard Deviation	21.4	1.3
% CV	5.9	5.6

Inter-Assay Precision: Two human samples were spiked with different concentrations of recombinant human IL-23 and assayed in four independent assays by different operators.

Concentration	Sample 1	Sample 2
Number of Assays	4	4
Mean Concentration (pg/mL)	372.3	24.6
Standard Deviation	24.6	3.1
% CV	6.4	12.4

Biological Samples:

Normal Ranges: Serum and plasma (Heparain, EDTA, and Citrate) samples from human donors were tested for endogenous human IL-23.

Sample Type	N	% Detectable	Min (pg/mL)	Max (pg/mL)	Median (pg/mL)
Serum	5	100	5.2	43.1	12.3
EDTA	5	100	5.0	59.4	13.7
Heparin	5	80	ND	42.4	8.6
Citrate	5	100	2.8	36.5	8.6

Cell Supernatant: Human PBMC (1 x 10^6 cells/mL) cells were stimulated under different conditions. The cell supernatant was collected after 72 hours and assayed for human IL-23.

Stimulation Condition	Concentration (pg/ml)
1 µg/mL of LPS	374.8
10 ng/mL of IFNγ and 1 µg/mL of LPS	832.7
Unstimulated	ND

Troubleshooting Guide:

Problem	Probable Cause	Solution
High Background	Background wells were contaminated	Avoid cross-well contamination by using the provided plate sealers. Use multichannel pipettes and change tips between pipetting samples and reagents.
	Insufficient washes	Increase number of washes. Increase soaking time between washes prior to addition of substrate solution.
	TMB Substrate Solution was contaminated	TMB Substrate Solution should be clear and colorless prior to addition to wells. Use a clean container prior to pipetting substrate solution into wells.
No or poor signal	Detection Antibody, Avidin-HRP or Substrate solution were NOT added	Rerun the assay and follow the protocol.
	Wrong reagent or reagents were added in wrong sequential order	
	Insufficient plate agitation	The plate should be agitated during all incubation steps using a plate shaker at a speed where solutions in wells are within constant motion without splashing.
	The wash buffer contains Sodium Azide (NaN3)	Avoid Sodium Azide contamination in the wash buffer as it inhibits HRP activity.
	Incubations were done at an inappropriate temperature, timing or without agitation	Rerun the assay and follow the protocol.
Low or poor standard curve signal	The standard was incorrectly reconstituted or diluted	Adjust the calculations and follow the protocol.
	Standard was inappropriately stored	Store the reconstituted standard stock solution in polypropylene vials at -70°C. Avoid repeated freeze-thaw cycles.
	Reagents added to wells with incorrect concentrations	Check for pipetting errors and the correct reagent volume.

Problem	Probable Cause	Solution
Signal is high, standard curves have saturated signal	Standard reconstituted with less volume than required	Reconstitute new lyophilized standard with the correct volume of solution recommended in the protocol.
	Standards/samples, detection antibody, Avidin-HRP or substrate solution were incubated for too long	Rerun the assay and follow the protocol.
Sample readings are out of range	Samples contain no or below detectable levels of the analyte	If samples are below detectable levels, it may be possible to use a larger sample volume. Contact technical support for appropriate protocol modifications.
	Samples contain analyte concentrations greater than highest standard point	Samples may require dilution and analysis.
High variation in samples and/or standards	Multichannel pipette errors	Confirm that pipette calibrations are accurate.
	Plate washing was not adequate or uniform	Ensure pipette tips are tightly secured. Ensure uniformity in all wash steps.
	Non-homogenous samples	Thoroughly mix samples before assaying.
	Samples may have high particulate matter	Remove particulate matter by centrifugation.
	Cross-well contamination	Do not reuse plate sealers. Always change tips for reagent additions. Ensure that pipette tips do not touch the reagents on the plate.

ELISA Plate Template

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

LEGEND MAX™ Kits are manufactured by **BioLegend Inc.**
8999 BioLegend Way
San Diego, CA 92121
Tel: 1.858.768.5800
Tel US & Canada Toll-Free: 1.877.Bio-Legend (1.877.246.5343)
Fax: 1.877.455.9587
Email: info@biolegend.com
biolegend.com

For a complete list of world-wide BioLegend offices and distributors, please visit our website at: biolegend.com

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