

# **ab119545 - IL-23 Mouse ELISA Kit**

## Instructions for Use

For the quantitative measurement of Mouse IL-23 concentrations in cell culture supernatant, serum and plasma (citrate).

This product is for research use only and is not intended for diagnostic use.

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## 1. BACKGROUND

Abcam's IL-23 Mouse ELISA (Enzyme-Linked Immunosorbent Assay) kit is an *in vitro* enzyme-linked immunosorbent assay for the quantitative measurement of Mouse IL-23 in cell culture supernatant, serum and plasma (citrate).

IL-23 specific antibodies have been precoated onto 96-well plates. Standards and test samples are added to the wells along with a biotin-conjugated IL-23 detection antibody then incubated at room temperature. Following washing, a Streptavidin-HRP conjugate is added to each well, incubated at room temperature and washed. TMB is added and then catalyzed by HRP to produce a blue color product that changes into yellow after addition of acidic stop solution. The density of yellow coloration is directly proportional to the amount of IL-23 captured on the plate.

Interleukin-23 was found during a genome scan for the IL-6/IL-12 cytokine family. IL-23 protein is a heterodimer, sharing a p40 subunit with IL-12, but having a distinct p19 subunit, which is IL-23 specific. IL-23 uses many of the same signal-transduction components as IL-12, so it binds to IL-12R $\beta$ 1 receptor, but not IL-12R $\beta$ 2.

IL-23 plays a role in type 1-polarized T-cell immune responses. Although IL-12 strongly activates naïve T-cells, the initial description of IL-23 reported preferential actions on memory T-cells to increase IFN- $\gamma$  production and proliferation suggesting an important role for IL-23 in controlling bacterial infections. IL-23 has further been described as a key cytokine controlling inflammation in peripheral tissues. Overexpression of p19 correlates with inflammation in multiple organs and epithelial tissues including skin. IL-23 was shown to be involved in inflammation of the nervous system and autoimmune diseases.

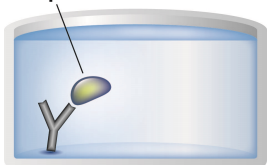
## 2. ASSAY SUMMARY

Primary Capture Antibody



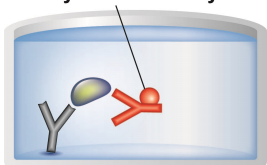
Prepare all reagents, samples and standards as instructed.

Sample



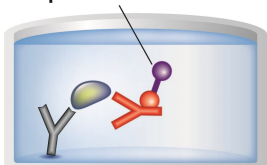
Add standards or samples to each well used.

Biotinylated Antibody



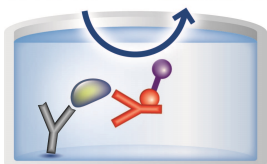
Add Biotin-Conjugated anti-mouse IL-23 antibody to appropriate wells. Incubate the plate.

Streptavidin-HRP



Wash and add prepared Streptavidin-HRP Conjugate to appropriate wells. Incubate at room temperature.

Substrate      Colored Product



Wash and add TMB Substrate to each well and incubate. Add Stop Solution to each well. Read immediately.

### 3. PRECAUTIONS

**Please read these instructions carefully prior to beginning the assay.**

All kit components have been formulated and quality control tested to function successfully as a kit. Modifications to the kit components or procedures may result in loss of performance.

### 4. STORAGE AND STABILITY

**Upon receipt, store kit immediately at 2-8°C.**

Refer to list of materials supplied for storage conditions of individual components. Observe the storage conditions for individual prepared components in section 9 Reagent Preparation.

### 5. MATERIALS SUPPLIED

Item	Amount	Storage Condition (Before Preparation)
Microplate coated with monoclonal antibody to Mouse IL-23 (12 x 8 wells)	96 wells	2-8 °C
Biotin-Conjugate anti-Mouse IL-23 monoclonal antibody	70 µL	2-8 °C
Streptavidin-HRP	150 µL	2-8 °C
IL-23 Standard lyophilized	2 Vials	2-8 °C
Sample Diluent	12 mL	2-8 °C
20X Assay Buffer Concentrate	5 mL	2-8 °C
20X Wash Buffer Concentrate	50 mL	2-8 °C
TMB Substrate Solution	15 mL	2-8 °C
Stop Solution (1M Phosphoric acid)	15 mL	2-8 °C

### **6. MATERIALS REQUIRED, NOT SUPPLIED**

These materials are not included in the kit, but will be required to successfully utilize this assay:

- 5 mL and 10 mL graduated pipettes
- 5  $\mu$ L to 1000  $\mu$ L adjustable single channel micropipettes with disposable tips
- 50  $\mu$ L to 300  $\mu$ L adjustable multichannel micropipette with disposable tips
- Multichannel micropipette reservoir
- Beakers, flasks, cylinders necessary for preparation of reagents
- Device for delivery of wash solution (multichannel wash bottle or automatic wash system)
- Microplate strip reader capable of reading at 450 nm (620 nm as optional reference wave length)
- Glass-distilled or deionized water
- Statistical calculator with program to perform regression analysis

### **7. LIMITATIONS**

- Assay kit intended for research use only. Not for use in diagnostic procedures
- Do not use kit or components if it has exceeded the expiration date on the kit labels
- Do not mix or substitute reagents or materials from other kit lots or vendors. Kits are QC tested as a set of components and performance cannot be guaranteed if utilized separately or substituted

### 8. TECHNICAL HINTS

- Samples generating values higher than the highest standard should be further diluted in the appropriate sample dilution buffers
- Avoid foaming or bubbles when mixing or reconstituting components
- Avoid cross contamination of samples or reagents by changing tips between sample, standard and reagent additions.
- Ensure plates are properly sealed or covered during incubation steps
- Complete removal of all solutions and buffers during wash steps.
- As exact conditions may vary from assay to assay, a standard curve must be established for every run.
- Disposable pipette tips, flasks or glassware are preferred, reusable glassware must be washed and thoroughly rinsed of all detergents before use.
- Improper or insufficient washing at any stage of the procedure will result in either false positive or false negative results. Empty wells completely before dispensing fresh wash solution, fill with Wash Buffer as indicated for each wash cycle and do not allow wells to sit uncovered or dry for extended periods.
- The use of radio immunotherapy has significantly increased the number of patients with Mouse anti-Mouse IgG antibodies (HAMA). HAMA may interfere with assays utilizing murine monoclonal antibodies leading to both false positive and false negative results. Serum samples containing antibodies to murine immunoglobulins can still be analyzed in such assays when murine immunoglobulins (serum, ascitic fluid, or monoclonal antibodies of irrelevant specificity) are added to the sample.
- **This kit is sold based on number of tests.** A 'test' simply refers to a single assay well. The number of wells that contain sample, control or standard will vary by product. Review the protocol completely to confirm this kit meets your requirements. Please contact our Technical Support staff with any questions

## 9. REAGENT PREPARATION

Equilibrate all reagents and samples to room temperature (18-25°C) prior to use.

### 9.1 **1X Wash Buffer**

Prepare 1X Wash Buffer by diluting the 20X Wash Buffer Concentrate with distilled or deionized water. To make 500 mL 1X Wash Buffer, combine 25 mL 20X Wash Buffer Concentrate with 475 mL distilled or deionized water. Mix thoroughly and gently to avoid foaming.

*Note: The 1X Wash Buffer should be stored at 2-8 °C and is stable for 30 days.*

### 9.2 **1X Assay Buffer**

Prepare 1X Assay Buffer by diluting the 20X Assay Buffer Concentrate with distilled or deionized water. To make 50 mL 1X Assay Buffer, combine 2.5 mL 20X Assay Buffer Concentrate with 47.5 mL distilled or deionized water. Mix thoroughly and gently to avoid foaming.

*Note: The 1X Assay Buffer should be stored at 2-8 °C and is stable for 30 days.*



## 9.3 1X Biotin Conjugated Antibody

To prepare the Biotin Conjugated Antibody, dilute the anti-mouse IL-23 monoclonal antibody 100-fold with 1X Assay Buffer. Use the following table as a guide to prepare as much 1X Biotin Conjugated Antibody as needed by adding the required volume ( $\mu\text{L}$ ) of the Biotin Conjugated Antibody to the required volume (mL) of Assay Buffer. Mix gently and thoroughly.

Number of strips	Volume of Biotin-Conjugated IL-23 antibody ( $\mu\text{L}$ )	1X Assay Buffer (mL)
1 - 6	30	2.97
7 - 12	60	5.94

*Note: The 1X Biotin-Conjugated Antibody should be used within 30 minutes after dilution.*

## 9.4 1X Streptavidin-HRP Conjugate

To prepare the Streptavidin-HRP Conjugate, dilute the anti-Streptavidin-HRP Conjugate 100-fold with 1X Assay Buffer. Use the following table as a guide to prepare as much 1X Streptavidin-HRP Conjugate as needed by adding the required volume ( $\mu\text{L}$ ) of the Streptavidin-HRP Conjugate to the required volume (mL) of distilled water. Mix gently and thoroughly.

Number of strips	Volume of Streptavidin-HRP ( $\mu\text{L}$ )	1X Assay Buffer (mL)
1 - 6	60	5.94
7 - 12	120	11.88

*Note: The 1X Streptavidin-HRP should be used within 30 minutes after dilution.*

## 10. STANDARD PREPARATIONS

Prepare serially diluted standards immediately prior to use. Always prepare a fresh set of standards for every use.

- 10.1 Prepare a 4,000 pg/mL **Stock Standard** by reconstituting one vial of the IL-23 standard with the volume of distilled water stated on the label. Hold at room temperature for 10-30 minutes. The 4,000 pg/mL **Stock Standard** cannot be stored for later use.
- 10.2 Label eight tubes with numbers 1 - 8.
- 10.3 Add 225  $\mu$ L Sample Diluent Buffer into all tubes number.
- 10.4 Prepare a 2,000 pg/mL **Standard 1** by transferring 225  $\mu$ L of the 4,000 pg/mL Stock Standard to tube 1. Mix thoroughly and gently.
- 10.5 Prepare **Standard 2** by transferring 225  $\mu$ L from Standard 1 to tube 2. Mix thoroughly and gently.
- 10.6 Prepare **Standard 3** by transferring 225  $\mu$ L from Standard 2 to tube 3. Mix thoroughly and gently.
- 10.7 Using the table below as a guide, repeat for tubes number 4 through to 7.
- 10.8 **Standard 8** contains no protein and is the Blank control

## ASSAY PREPARATION

Standard	Sample to Dilute	Volume to Dilute ( $\mu\text{L}$ )	Volume of Diluent ( $\mu\text{L}$ )	Starting Conc. ( $\text{pg/mL}$ )	Final Conc. ( $\text{pg/mL}$ )
1	Stock	225	225	4,000	2,000
2	Standard 1	225	225	2,000	1,000
3	Standard 2	225	225	1,000	500
4	Standard 3	225	225	500	250
5	Standard 4	225	225	250	125
6	Standard 5	225	225	125	62.5
7	Standard 6	225	225	62.5	31.3
8	None	-	225	-	0



## 11. SAMPLE COLLECTION AND STORAGE

- Cell culture supernatant, serum and plasma (citrate) were tested with this assay. Other biological samples might be suitable for use in the assay. Remove serum or plasma from the clot or cells as soon as possible after clotting and separation.
- Samples containing a visible precipitate must be clarified prior to use in the assay. Do not use grossly hemolyzed or lipemic specimens.
- Samples should be aliquoted and must be stored frozen at -20°C to avoid loss of bioactive Mouse IL-23. If samples are to be run within 24 hours, they may be stored at 2° to 8°C.
- Avoid repeated freeze-thaw cycles. Prior to assay, the frozen sample should be brought to room temperature slowly and mixed gently.
- Aliquots of serum supernatant samples (spiked) were stored at -20°C and thawed 5 times, and the Mouse IL-23 levels determined. There was no significant loss of Mouse IL-23 immunoreactivity detected by freezing and thawing.
- Aliquots of serum samples (spiked) were stored at, 2-8°C, room temperature (RT) and at 37°C, and the Mouse IL-23 level determined after 24 h. There was no significant loss of Mouse IL-23 immunoreactivity detected during storage under above conditions.

## **12. PLATE PREPARATION**

- The 96 well plate strips included with this kit are supplied ready to use.
- Unused well strips should be returned to the plate packet and stored at 2-8°C
- For statistical reasons, we recommend each sample should be assayed with a minimum of two replicates (duplicates)
- Well effects have not been observed with this assay.

## **13. ASSAY PROCEDURE**

- **Equilibrate all materials and prepared reagents to room temperature prior to use.**
  - **It is recommended to assay all standards, controls and samples in duplicate.**
- 13.1. Prepare all reagents, working standards, and samples as directed in the previous sections. Determine the number of microplate strips required to test the desired number of samples plus appropriate number of wells needed for running blanks and standards.
  - 13.2. Wash the microplate twice with approximately 400  $\mu$ L 1X Wash Buffer per well with thorough aspiration of microplate contents between washes. Allow the 1X Wash Buffer to remain in the wells for about 10 - 15 seconds before aspiration. Take care not to scratch the surface of the microplate.
  - 13.3. After the last wash step, empty wells and tap microplate on absorbent pad or paper towel to remove excess 1X Wash Buffer. Use the microplate strips immediately after washing. Alternatively the microplate strips can be placed upside down on a wet absorbent paper for not longer than 15 minutes. Do not allow wells to dry.
  - 13.4. Add 100  $\mu$ L of the prepared standards to appropriate wells, including the no protein controls.
  - 13.5. Add 50  $\mu$ L of Sample Diluent to the sample wells.
  - 13.6. Add 50  $\mu$ L of each sample to appropriate wells.
  - 13.7. Add 50  $\mu$ L of 1X Biotin Conjugated Antibody to all wells.
  - 13.8. Cover with adhesive film and incubate at room temperature (18° to 25°C) for 3 hours (microplate can be incubated on a shaker set at 400 rpm).
  - 13.9. Remove adhesive film and empty wells. Wash microplate strips 4 times according to step 13.2. Proceed immediately to step 13.10.

- 13.10. Add 100  $\mu$ L of 1X Streptavidin-HRP to all wells, including the blank wells.
- 13.11. Cover with an adhesive film and incubate at room temperature (18° to 25°C) for 1 hour (microplate can be incubated on a shaker set at 400 rpm).
- 13.12. Remove adhesive film and empty wells. Wash microplate strips 3 times according to step 13.2. Proceed immediately to the next step.
- 13.13. Pipette 100  $\mu$ L of TMB Substrate Solution to all wells.
- 13.14. Incubate the microplate strips at room temperature (18 to 25°C) for 10 minutes. Avoid direct exposure to intense light.

*Note:* The color development on the plate should be monitored and the substrate reaction stopped (see step 13.15) before the signal in the positive wells becomes saturated. Determination of the ideal time period for color development should be done individually for each assay. It is recommended to add the stop solution when the highest standard has developed a dark blue color. The substrate reaction should be stopped as soon as Standard 1 has reached an OD of 0.9 - 0.95.

- 13.15. Stop the enzyme reaction by adding 100  $\mu$ L of Stop Solution into each well.

*Note:* It is important that the Stop Solution is mixed quickly and uniformly throughout the microplate to completely inactivate the enzyme. Results must be read immediately after the Stop Solution is added or within one hour if the microplate strips are stored at 2 - 8°C in the dark.

- 13.16. Read absorbance of each microplate on a spectrophotometer using 450 nm as the primary wave length (optionally 620 nm as the reference wave length; 610 nm to 650 nm is acceptable). Blank the plate reader according to the manufacturer's instructions by using the blank wells. Determine the absorbance of both the samples and the standards.

## 14. CALCULATIONS

Average the duplicate reading for each standard, sample and control blank. Subtract the control blank from all mean readings. Plot the mean standard readings against their concentrations and draw the best smooth curve through these points to construct a standard curve. Most plate reader software or graphing software can plot these values and curve fit. A five parameter algorithm (5PL) usually provides the best fit, though other equations can be examined to see which provides the most accurate (e.g. linear, semi-log, log/log, 5-parameter logistic). Extrapolate protein concentrations for unknown and control samples from the standard curve plotted. Samples producing signals greater than that of the highest standard should be further diluted in appropriate buffer and reanalyzed, then multiplying the concentration found by the appropriate dilution factor.

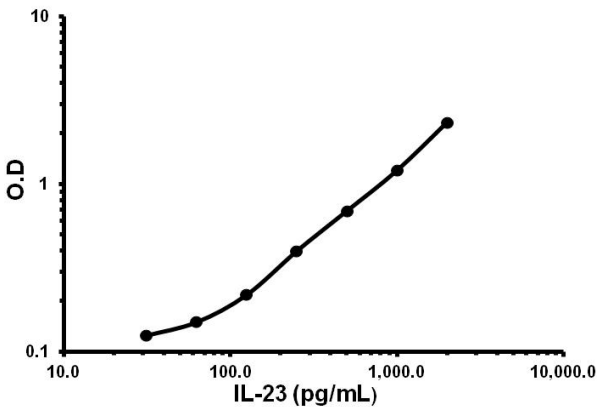
If samples have been diluted 1:2, as stated in step 13.6, the concentration obtained from the standard curve must be multiplied by the dilution factor ( $\times 2$ ) to obtain an accurate value. This should be in addition to any sample dilutions undertaken by the user.

Calculation of samples with a concentration exceeding standard 1 may result in incorrect, low Mouse IL-23 levels. Such samples require further external predilution according to expected Mouse IL-23 values with Sample Diluent in order to precisely quantitate the actual Mouse IL-23 level.



**15. TYPICAL DATA**

**TYPICAL STANDARD CURVE** – Data provided for **demonstration purposes only**. A new standard curve must be generated for each assay performed.



Standard Curve Measurements			
Conc. (pg/mL)	O.D. 450 nm		Mean O.D.
	1	2	
0	0.056	0.058	0.057
31.3	0.121	0.128	0.125
62.5	0.144	0.156	0.150
125	0.217	0.220	0.218
250	0.405	0.390	0.398
500	0.709	0.671	0.690
1,000	1.240	1.166	1.203
2,000	2.350	2.311	2.330

**Figure 1.** Example of Mouse IL-23 protein standard curve.

## 16. TYPICAL SAMPLE VALUES

### **SERUM**

A panel of sera samples from randomly selected apparently healthy mice was tested for Mouse IL-23. There were no detectable Mouse IL-23 levels found. Elevated Mouse IL-23 levels depend on the type of immunological disorder.

### **SENSITIVITY -**

The limit of detection of Mouse IL-23 defined as the analyte concentration resulting in an absorbance significantly higher than that of the dilution medium (mean plus 2 standard deviations) was determined to be 16.0 pg/mL (mean of 6 independent assays).

### **RECOVERY –**

The spike recovery was evaluated by spiking 4 levels of Mouse IL-23 into serum. Recoveries were determined in 3 independent experiments with 4 replicates each. The unspiked serum was used as blank in these experiments. The recovery ranged from 41% to 53% with an overall mean recovery of 49%.

### **LINEARITY OF DILUTION –**

Serum samples with different levels of Mouse IL-23 were analyzed at serial 2 fold dilutions with 4 replicates each.

The recovery ranged from 108.4% to 123.1% with an overall recovery of 114.8%

### **PRECISION –**

Intra- and Inter-assay reproducibility was determined by measuring samples containing different concentrations of Mouse IL-23.

	<b>Intra-Assay</b>	<b>Inter-Assay</b>
n=	8	8
%CV	8.3	2.5

### **17. ASSAY SPECIFICITY**

The assay detects both natural and recombinant Mouse IL-23. The interference of GM-CSF, IFN- $\gamma$ , IL-1 $\alpha$ , IL-2, IL-4, IL-5, IL-6, IL-10, IL-12 (p70), IL-13, IL-17, IL-18, IL-22, TNF- $\alpha$ , MCP-1, MCP-3, MIP-1 $\alpha$ , MIP-1 $\beta$ , RANTES, IP-10 was evaluated by spiking these proteins at physiologically relevant concentrations into IL-23 positive serum. There was no cross reactivity detected.

## 18. TROUBLESHOOTING

<b>Problem</b>	<b>Cause</b>	<b>Solution</b>
Poor standard curve	Inaccurate pipetting	Check pipettes
	Improper standards dilution	Prior to opening, briefly spin the stock standard tube and dissolve the powder thoroughly by gentle mixing
Low Signal	Incubation times too brief	Ensure sufficient incubation times; change to overnight standard/sample incubation
	Inadequate reagent volumes or improper dilution	Check pipettes and ensure correct preparation
Samples give higher value than the highest standard	Starting sample concentration is too high.	Dilute the specimens and repeat the assay
Large CV	Plate is insufficiently washed	Review manual for proper wash technique. If using a plate washer, check all ports for obstructions
	Contaminated wash buffer	Prepare fresh wash buffer
Low sensitivity	Improper storage of the kit	Store the all components as directed.

19. NOTES





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