ab119536 – IL-17A Rat ELISA Kit

Instructions for Use

For the quantitative measurement of Rat IL-17 (Interleukin-17) concentrations in Cell culture supernatant, serum and plasma (EDTA, citrate, heparin).

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

Version 6 Last Updated 11 January 2019

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1. BACKGROUND

Abcam's IL-17A Rat *in vitro* ELISA (Enzyme-Linked Immunosorbent Assay) kit is designed for accurate quantitative measurement of Rat IL-17 (Interleukin-17) concentrations in Cell culture supernatant, serum and plasma (EDTA, citrate, heparin).

IL-17A specific antibodies have been precoated onto 96-well plates. Standards and test samples are added to the wells along with a biotin-conjugated IL-17A 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-17A captured on the plate.

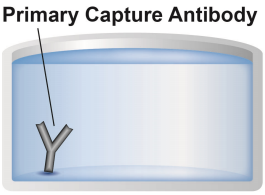
A new family of cytokines, Interleukin-17, has recently been defined that reveals a distinct ligand-receptor signaling system. There is high evidence for its importance in the regulation of immune responses. IL-17A was first characterized and six IL-17 family members (IL-17A-F) have subsequently been described. IL-17A, a homodimeric cytokine of about 32 kDa, is largely produced by activated memory T lymphocytes, but stimulates innate immunity and host defense. IL-17A and IL-17F both mobilize neutrophils partly through granulopoeisis and CXC chemokine induction, as well as increased survival locally. IL-17A and IL-17F production by T lymphocytes is regulated by IL-23 independent of T cell receptor activation.

The T help 1 (Th1) and Th2 cell classification has until recently provided the framework for understanding CD4(+) T cell biology and the interplay between innate and adaptive immunity. Recent studies have defined a previously unknown arm of the CD4(+) T cell effector response, the Th17 lineage. This subset of T cells produces interleukin 17, which is highly proinflammatory and induces severe autoimmunity.

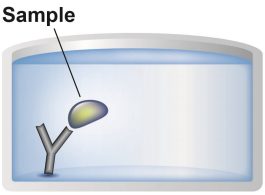
Whereas IL-23 serves to expand previously differentiated T(H)-17 cell populations, IL-6 and transforming growth factor-beta (TGF-beta) induce the differentiation of T(H)-17 cells from naive precursors.

Increasing evidence shows that IL-17 family members play an active role in inflammatory diseases, autoimmune diseases, and cancer. The IL-17 signaling system is operative in disparate tissues such as articular cartilage, bone, meniscus, brain, hematopoietic tissue, kidney, lung, skin and intestine. Thus, the evolving IL-17 family of ligands and receptors may play an important role in the homeostasis of tissues in health and disease beyond the immune system. Increased levels of IL-17 have been associated with several conditions, including airway inflammation, rheumatoid arthritis, intraperitoneal abscesses and adhesions, inflammatory bowel disease, allograft rejection, psoriasis, cancer and multiple sclerosis.

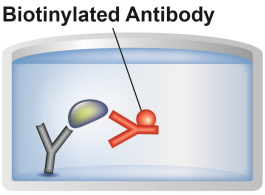
2. ASSAY SUMMARY



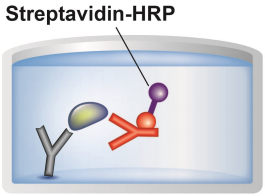
Prepare all reagents, samples and standards as instructed.



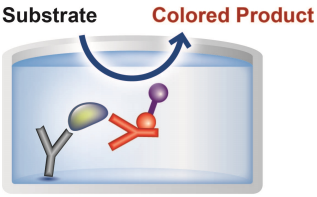
Add standards or samples to each well used.



Add Biotin-Conjugated anti-rat IL-17 antibody to appropriate wells. Incubate the plate.



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



Wash and add TMB Substrate to each well. Incubate and 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

Store kit at 2-8ºC immediately upon receipt.

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 rat IL-17A (12 x 8 wells)	96 wells	2-8 ºC
Biotin Conjugated anti-rat IL-17A monoclonal antibody	70 µL	2-8 ºC
Streptavidin-HRP	150 µL	2-8 ºC
IL-17A Standard Lyophilized	2 Vials	2-8 ºC
Sample Diluent	12 mL	2-8 ºC
20X Assay Buffer Concentrate	5 mL	2-8 ºC
20X Wash Buffer Concentrate	50 mL	2-8 ºC
TMB Substrate Solution	15 mL	2-8 ºC
Stop Solution (1 M Phosphoric Acid)	15 mL	2-8 ºC
Adhesive Films	4 units	2-8 ºC

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 µL to 1000 µL adjustable single channel micropipettes with disposable tips
- 50 µL to 300 µL 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 Human 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. If crystals have formed in the Buffer Concentrates, warm them gently until they have completely dissolved.

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 ºC 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 ºC and is stable for 30 days.

9.3 1X Biotin Conjugated Antibody

To prepare the Biotin Conjugated Antibody, dilute the anti-rat IL-17 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 (µL) 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-17 antibody (µL)	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 200-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 (µL) of the Streptavidin-HRP Conjugate to the required volume (mL) of distilled water. Mix gently and thoroughly.

Number of strips	Volume of Streptavidin-HRP (µL)	1X Assay Buffer (mL)
1 - 6	30	5.97
7 - 12	60	11.94

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

- All other solutions are supplied ready to use

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 200 pg/mL **Stock Standard** by reconstituting one vial of the Rat IL-17 standard with the volume of distilled water stated on the label. Hold at room temperature for 10-30 minutes. The 200 pg/mL **Stock Standard** cannot be stored for later use.

10.2 Label eight tubes with numbers 1 - 8.

10.3 Add 225 µL Sample diluent into all tubes.

10.4 Prepare a 100 pg/mL **Standard 1** by transferring 225 µL of the 200 pg/mL Stock Standard to µL sample diluent to tube 1. Mix thoroughly and gently.

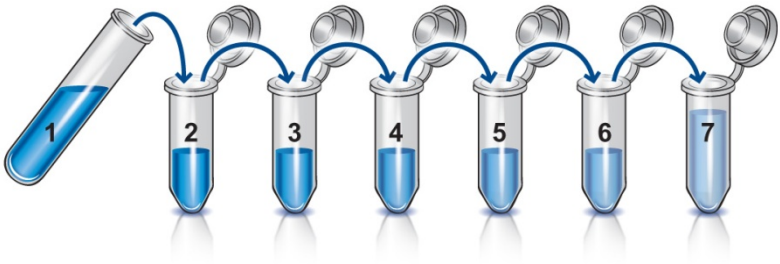
10.5 Prepare **Standard 2** by transferring 225 µL from Standard 1 to tube 2. Mix thoroughly and gently.

10.6 Prepare **Standard 3** by transferring 225 µL 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

Standard	Sample to Dilute	Volume to Dilute (µL)	Volume of Diluent (µL)	Starting Conc. (pg/mL)	Final Conc. (pg/mL)
1	Stock	225	225	200	100
2	Standard 1	225	225	100	50
3	Standard 2	225	225	50	25
4	Standard 3	225	225	25	12.5
5	Standard 4	225	225	12.5	6.3
6	Standard 5	225	225	6.3	3.1
7	Standard 6	225	225	3.1	1.6
8	None	-	225	-	0



11. SAMPLE COLLECTION AND STORAGE

- Cell culture supernatant and serum were tested with this assay. Other biological samples might be suitable for use in the assay. Remove serum 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.

- Possible “Hook Effects” may be observed due to high sample concentrations. It is recommended to run several dilutions of your sample to ensure an accurate reading.

- Samples should be aliquoted and must be stored frozen at -20°C to avoid loss of bioactive Rat IL-17. 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 and properly diluted with 1X Sample Diluent.

- Aliquots of serum samples (spiked or unspiked) were stored at -20°C and thawed several times, and the Rat IL-17 levels determined. There was no significant loss of Rat IL-17 immunoreactivity detected by freezing and thawing.

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 µL 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. Pipette 100 µL of each standard dilution into appropriate wells, including the no protein control.

13.5. Pipette 50 µL of Sample Diluent to sample wells.

13.6. Pipette 50 µL of each sample to appropriate wells.

13.7. Pipette 50 µL of Biotin Conjugate to all wells.

13.8. Cover with adhesive film and incubate at room temperature (18° to 25°C) for 2 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 µL of Streptavidin-HRP to all wells, including the blank wells.

13.11. Cover with adhesive film and incubate at room temperature (18° to 25°C) for 1 hours (microplate can be incubated on a shaker set at 400 rpm).

13.12. Remove adhesive film and empty wells. Wash microplate strips 4 times according to step 13.2. Proceed immediately to step 13.13.

13.13. Add 100 µL of TMB Substrate Solution to all wells.

13.14. Incubate the microplate strips at room temperature (18 to 25°C) for 30 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 to be done individually for each assay. It is recommended to add the stop solution when the highest standard has developed a dark blue color. Alternatively the color development can be monitored by the ELISA reader at 620 nm. 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 µL 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.

Note: In case of incubation without shaking the obtained O.D. values may be lower than indicated below. Nevertheless the results are still valid.

14. CALCULATIONS

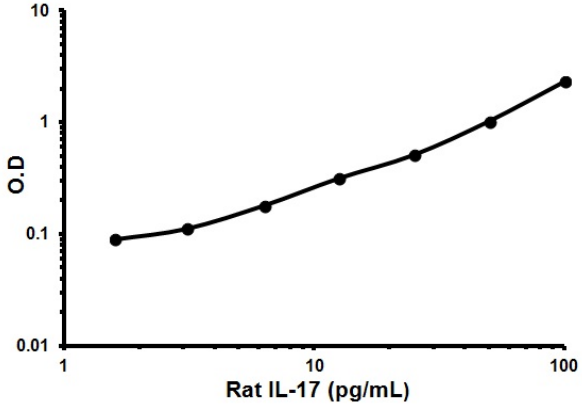
Average the duplicate reading for each standard, sample and control blank. Subtract the control blank from all mean readings. Plot the mean standard readings against their concentrations and draw the best smooth curve through these points to construct a standard curve. Most plate reader software or graphing 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 instructions in this protocol have been followed samples have been diluted 1:2 (as Step 13.6), the concentration read from the standard curve must be multiplied by the dilution factor (x 2). This should be in addition to any sample dilution undertaken by the user.

Calculation of samples with a concentration exceeding standard 1 may result in incorrect, low Rat IL-17 levels. Such samples require further external predilution according to expected Rat IL-17 values with Sample Diluent in order to precisely quantitate the actual Rat IL-17 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.	**O.D. 450 nm**		**Mean**
(pg/mL)	**1**	**2**	**O.D.**
0	0.082	0.067	0.075
1.6	0.091	0.086	0.089
3.1	0.114	0.108	0.111
6.3	0.178	0.180	0.179
12.5	0.344	0.282	0.313
25.0	0.509	0.506	0.508
50.0	1.037	0.999	1.018
100.0	2.297	2.300	2.299

Figure 1. Example of a Rat IL-17 protein standard curve.

16. TYPICAL SAMPLE VALUES

EXPECTED VALUES –

There were no detectable Rat IL-17 levels found. Elevated Rat IL-17 levels depend on the type of immunological disorder.

SENSITIVITY –

The limit of detection for IL-17 defined as the analyte concentration resulting in an absorption significantly higher than the absorption of the dilution medium (mean plus two standard deviations) was determined to be 1.0 pg/mL (mean of 6 independent assays).

RECOVERY –

The spike recovery was evaluated by spiking 3 levels of Rat IL-17 into serum, plasma (EDTA, citrate, heparin) and cell culture supernatant samples. Recoveries were determined with 4 replicates each. For recovery data see the table below.

The unspiked serum, plasma, cell culture supernatant was used as blank in these experiments.

Recoveries were shown to depend on the serum used.

Sample Matrix	Spike High (%)	Spike Medium (%)	Spike Low (%)
Serum	44	34	39
Plasma (EDTA)	31	20	26
Plasma (citrate)	59	37	29
Plasma (heparin)	64	45	37
Cell culture supernatant	112	92	103

DILUTION PARALLELISM –

Serum, plasma cell culture supernatant samples with different levels of Rat IL-17 were analyzed at serial 2 fold dilutions with 4 replicates each. For recovery data see table below.

Sample Matrix	Recovery of Exp. Value	
	Range (%)	Mean (%)
Serum	85-122	102
Plasma (EDTA)	93-125	107
Plasma (citrate)	95-114	106
Plasma (heparin)	64-126	97
Cell culture supernatant	79-89	86

PRECISION –

Intra- and Inter-assay reproducibility was determined by measuring samples containing different concentrations of Rat CD137.

	Intra-Assay	Inter-Assay
n=	7	7
%CV	8.5	7.6

17. ASSAY SPECIFICITY

Cross reactivity and interference of circulating factors of the immune system were evaluated by spiking these proteins at physiologically relevant concentrations into a Rat IL-17 positive sample.

There was no cross reactivity detected, notably not with Rat IFN-γ, Rat TNF-α, Rat IL-1a, Rat IL-4, Rat MCP-1, Rat GM-CSF.

18. TROUBLESHOOTING

Problem	Cause	Solution
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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