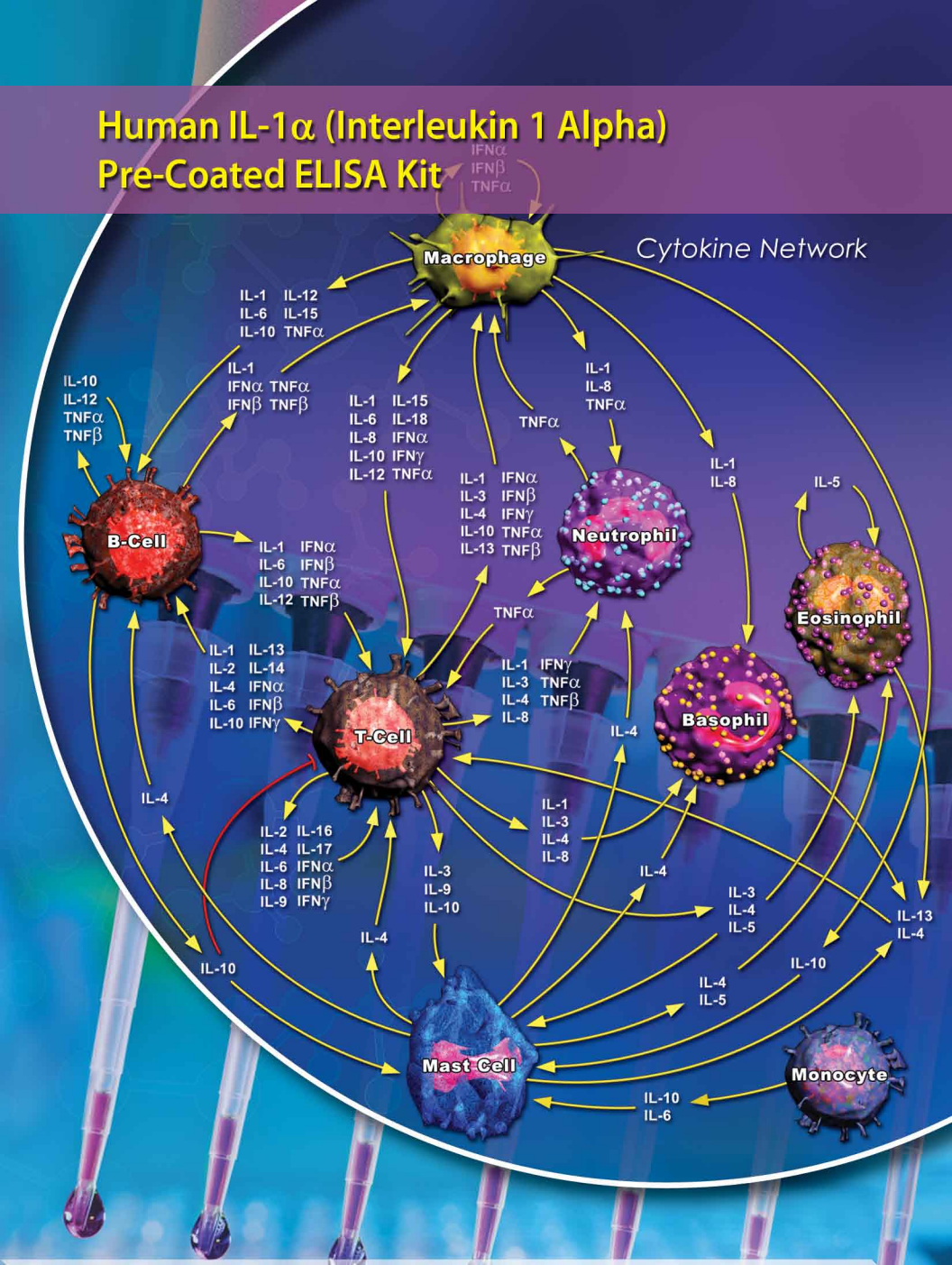
Human IL-1α (Interleukin 1 Alpha) Pre-Coated ELISA Kit



USER MANUAL

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Human IL-1α (Interleukin 1 Alpha) Pre-Coated ELISA Kit

Catalog No: 90-2081
1 × 96 well Format (96 tests)
Detection Range: 3.9 – 250 pg/ml
Sensitivity: < 2.34 pg/ml

This immunoassay kit allows for the in vitro quantitative determination of Human IL-1α concentrations in serum, plasma and other biological fluids.

This kit is for Research Use Only. Not for use in diagnostic/therapeutics procedures.

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I. BACKGROUND

IL-1α and IL-1β are closely related potent pro inflammatory members of the IL-1 family and are produced by dendritic cells. The secretion of these cytokines is an integral component of the role of dendritic cells in orchestrating immune and inflammatory responses. Both IL-1α and IL-1β transduce signals by binding to IL-1 type I receptor (IL-1RI) with an equal affinity. IL-1α releases after an injury can induce activation of transcription factors nuclear factor (NF) kappa B and AP-1 (Activator Protein 1), which promote expression of genes involved in cell survival, proliferation, and angiogenesis. IL-1α can be found constitutively inside cells under normal homeostasis, and it is active in its precursor as well as calpain-processed mature form. IL-1α has a functional nuclear localization sequence and is active in the intracellular compartment, especially in the nucleus, as a transcription regulator, whereas it affects inflammation and immunity outside the cell. IL-1α is expressed autonomously by HNSCCs (Head and Neck Squamous Cell Carcinomas) and a variety of other cancers, raising the possibility that IL-1α may serve as an autocrine factor that stimulates the activation of pro survival transcription factors and target genes in cancer.

II. OVERVIEW

This This assay employs an antibody specific for anti-human IL-1α coated on a 96-well plate. Standards and samples are pipetted into the wells and IL-1α present in a sample is bound to the wells by the immobilized antibody. The wells are washed and biotinylated anti-humanIL-1α antibody is added. After washing away unbound biotinylated antibody, HRP-conjugated streptavidin is pipetted to the wells. The wells are again washed, a TMB substrate solution is added to the wells and color develops in proportion to the amount of IL-1α bound. The Stop Solution changes the color from blue to yellow, and the intensity of the color is measured at 450 nm.

III. ADVANTAGES

Multiple samples can be analyzed in a low volume, high-throughput format. Full analysis can be completed in 4 hours.

IV. STORAGE

Kit can be stored in 4°C, if you are using within a week.

If you are using within 6 months, lyophilized standard can be stored in -20°C and other components at 4°C.

Kit Components

Item	Specifications	Storage
96 well Strip ELISA Plate	8 × 12 well	4°C
Lyophilized Standard	2 vials	-20°C
Sample and Standard Dilution Buffer	20 ml	4°C
Biotinylated Detection Antibody for hIL-1α	120 µl	4°C
Antibody Dilution Buffer	10 ml	4°C
HRP Conjugated Streptavidin (SABC)	120 µl	4°C
SABC Dilution Buffer	10 ml	4°C
TMB Substrate	10 ml	4°C
Stop Solution	10 ml	4°C
25X Wash Buffer	30 ml	4°C
Plate Sealer	5 pieces	
Product Manual	1	

Material Required, (not supplied)

Microplate Reader
37°C Incubator
Plate Reader
Multi Chanel Pipette and disposable tips
Eppendorf Tubes
Deionized Water

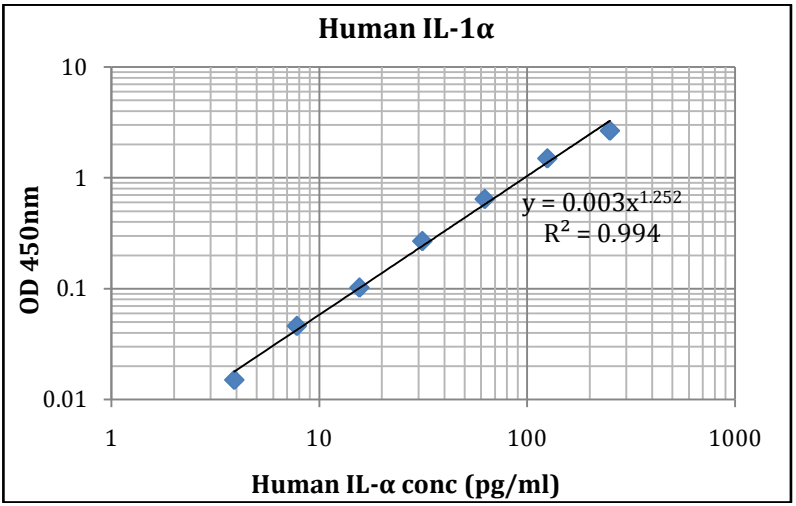
V. PRECAUTIONS FOR USE

1. To inspect the validity of experiment operation and the appropriateness of sample dilution proportion, pilot experiment using standards and a small number of samples is recommended.

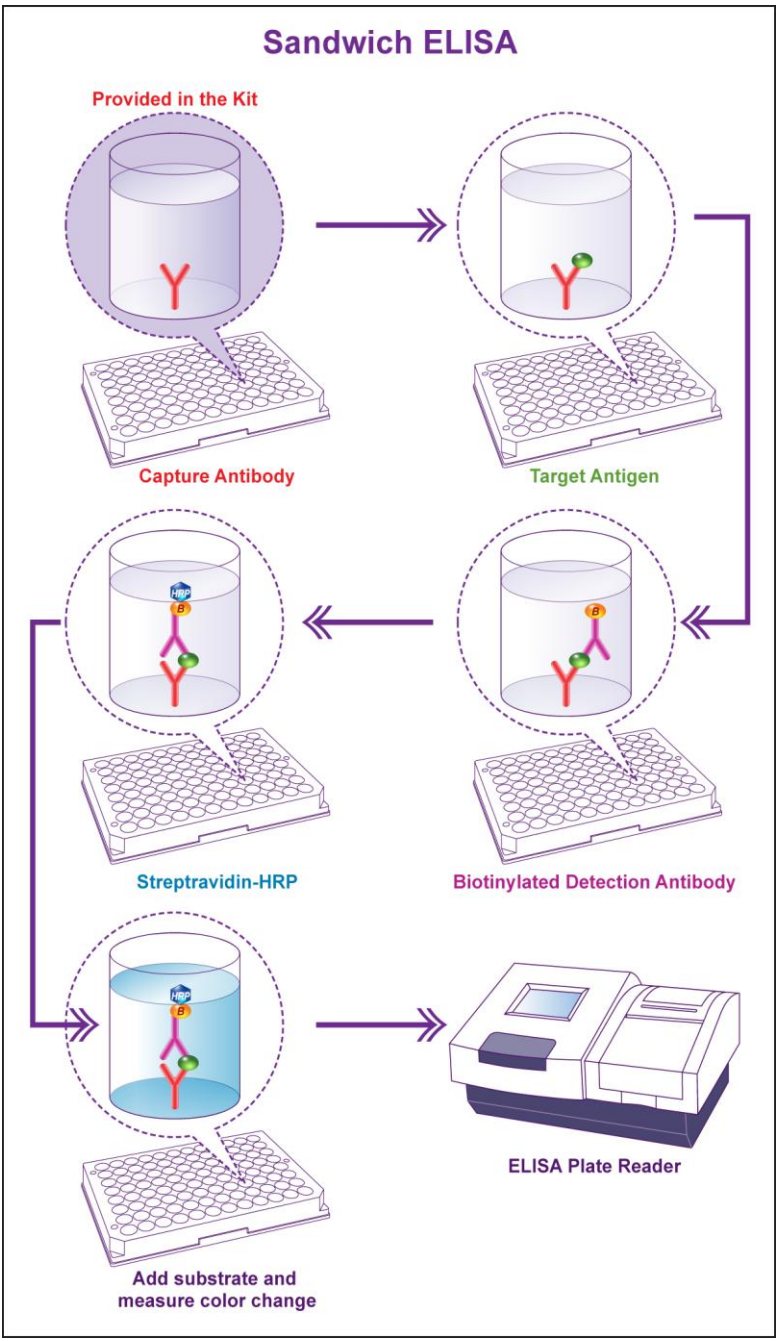
2. After opening and before using, keep plate dry.
3. Before using the Kit, spin tubes and bring down all components to the bottom of tubes.
4. Storage TMB reagents avoid light.
5. Washing process is very important, not fully wash easily cause a false positive.
6. Duplicate well assay is recommended for both standard and sample testing.
7. Don't let Micro plate dry at the assay, for dry plate will inactivate active components on plate.
8. Don't reuse tips and tubes to avoid cross contamination.
9. Avoid using the reagents from different batches together.

VI. STANDARD CURVE

Human IL-1α Standard Curve is shown below.



X	pg/ml	250	125	62.5	31.3	15.6	7.8	3.9	0
Y	O.D.450	2.692	1.530	0.679	0.305	0.139	0.083	0.052	0.037


Sandwich ELISA
Provided in the Kit
Capture Antibody
Target Antigen
Biotinylated Detection Antibody
Streptravidin-HRP
ELISA Plate Reader
Add substrate and
measure color change

VII. REAGENT PREPARATION AND STORAGE

Included buffers and reagents are optimized for use with this kit. Substitution with other reagents is not recommended and may not give optimal results.

1. **Prepare Standard Curve:** One hour before the experiment.

   a. Quick spin down one vial of lyophilized standard. ***(DO NOT dilute standard directly on the plate)***. Add 1ml of sample/standard dilution buffer into one of the standard tube. Incubate at room temperature for 10 min. Mix thoroughly by vortex. Stock Standard concentration is 250 pg/ml.

   b. Label Label 6 eppendorf tubes with 125 pg/ml, 62.5 pg/ml, 31.3 pg/ml, 15.6 pg/ml, 7.8 pg/ml, 3.9 pg/ml respectively. Add 0.3 ml of sample/ standard dilution buffer into each tube. Add 0.3 ml of stock standard (250pg/ml) into 1st tube and mix thoroughly. Transfer 0.3 ml from 1st tube to 2nd tube and mix thoroughly. Transfer 0.3 ml from 2nd tube to 3rd tube mix thoroughly, and so on.

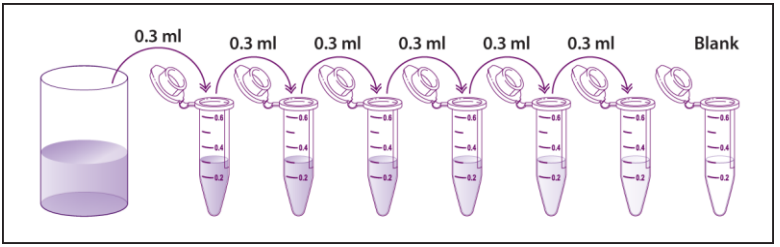


Fig 1: Dilution tubes

Note: *Standard Solutions are best used within 2 hrs. Standard solution should be stored at 4°C for up to 12 hrs. or store at -20°C for up to 48 hrs. Avoid repeated freeze-thaw.*

2. **Sample Preparation and Storage:** Test samples should be collected, analyze immediately (within 2 hrs.) or aliquot and store at -20°C for long term. Avoid multiple freeze-thaw cycles.

   a. Cell culture supernatants: Centrifuge to remove precipitate, analyze immediately or aliquot and store at -20°C.

b. Serum: Coagulate the serum at room temperature about 1 hr. Centrifuge approximately 1000 × g for 15 min. Analyze serum immediately or aliquot and store at -20°C.

c. Plasma: Collect plasma with heparin or EDTA as the anti-coagulant. Centrifuge for 15 min at 2-8°C at 1500 × g within 30 min of collection. For eliminating the platelet effect, suggesting that further centrifugation for 10 min at 2-8°C at 10,000 × g. Analyze immediately or aliquot and store frozen at -20°C.

d. Tissue Homogenates: For general information, hemolysis blood may affect the results, you should rinse the tissues with ice cold PBS (0.01M, pH 7.4) to remove excess blood thoroughly. Tissue pieces should be weighed and then minced to small pieces. This will be homogenized in PBS in a cold glass homogenizer. (Volume depends on the weight of the tissue, 1gram of tissue requires 9 ml of ice cold PBS with protease inhibitor). To further break the cells, you can sonicate the suspension with an ultrasonic cell disrupter or subject it to freeze-thaw cycle. Homogenates are then centrifuged for 5 min. at 5000 × g to get the supernatant.

Note: *Samples to be used within 5 days may be store at 4°C, otherwise sample should be stored at -20°C (< 1 month) or -80°C (< 2 months) to avoid loss of bioactivity and contamination. Hemolyzed samples are not suitable for use in this Assay.*

e. End user should estimate the concentration of the target protein in the test samples first, then select proper dilution factor to make the diluted target protein concentration falls the optimal detection range of the kit. Dilute the samples with the provided dilution buffer. Several trials may be necessary in practice. The test sample should be well mixed with the dilution buffer. Standard curve and sample should be made before the experiment.

High target protein concentration 2.5-25 ng/ml: Dilute 1:100 (add 1 µl of sample into 99 µl of sample/ standard dilution buffer)

Medium target protein concentration 250-2500 pg/ml: Dilute 1:10 (add 10 µl of sample into 90 µl of sample/ standard dilution buffer).

Low target protein concentration 3.9-250 pg/ml: Dilute 1:2 (add 50 µl of sample into 50 µl of sample/ standard dilution buffer).

Very low target protein concentration <3.9 pg/ml: Do not dilute, use 100 µl of sample.

3. **Preparation of Biotin detection antibody working solution:** Prepare within one hour before the experiment. Calculate total volume working solution required. (0.1 ml/well × number of wells. Add 100-200 µl extra).

   Dilute Biotin detection antibody with antibody dilution buffer at 1:100 and mix thoroughly. (*i.e.* add 1 µl of Biotin conjugated detection antibody into 99 µl of antibody dilution buffer).

4. **Preparation of HRP-Streptavidin Conjugate (SABC) working solution:** Prepare within 30 min before the experiment. Calculate total volume working solution required. (0.1 ml/well × number of wells. Add 100-200 µl extra).

   Dilute SABC with SABC dilution buffer at 1:100 and mix thoroughly. (*i.e.* add 1 µl of SABC into 99 µl of SABC dilution buffer).

5. **Preparation of 1 X Wash buffer:** Prepare 1 X Wash buffer by diluting 25 X Wash buffer in sterile water. Diluted Wash buffer may be stored at 4°C, however we recommend preparing fresh 1 X wash buffer for each experiment.

   For example: *10 ml of 25X Wash buffer in 240 ml of sterile water.*

VIII. ASSAY PROCEDURE

Before starting the experiment, equilibrate the SABC working solution and TMB substrate for at least 30 min at room temperature. When diluting samples and reagents, they should be mixed completely and evenly. It is recommended to plot a standard curve for each test.

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.

1. Set standard, test sample and blank (control zero) wells on the pre-coated plate and then record their position. It is recommended to measure each standard and sample in duplicate.

   Note: *Wash the plate twice before adding standard, sample and blank into the well.*

2. Add 0.1 ml of standard 250 pg/ml. 125 pg/ml, 62.5 pg/ml, 31.2 pg/ml, 15.6 pg/ml, 7.8 pg/ml, 3.9 pg/ml and Blank (control zero dilution buffer) into standard well.
3. Add 0.1 ml of diluted samples into test sample wells.
4. Seal plate with a cover and incubate at 37°C for 90 min.
5. Remove the cover and discard samples and standard solution by tapping plate on an absorbent paper.

   Note: *DO NOT let the wells completely dry any time. DO NOT wash plate.*

6. Add 0.1 ml of Biotin-detection antibody working solution into the above wells (Standards, control zero and samples).
7. Seal plate with cover and incubate at 37°C for 60 min.
8. Remove the cover, and wash plate 3 times with 1 X wash buffer.
9. Add 0.1 ml of SABC working solution into each well. Cover the plate and incubate at 37°C for 30 min.
10. Remove the cover and wash plate 5 times with 1 X wash buffer. Each time let the wash buffer stay in the well for 1-2 min.
11. Add 90 µl of TMB substrate into each well, cover the plate and incubate at 37°C in dark within 15-30 min. *(**Note**: This incubation time is for reference use only. The optimal time should be determined by end user)*. The shades of blue can be seen in the first 3-4 wells, only on most concentrated standards. Other wells show no obvious color.
12. Add 50 µl of stop solution into each well and mix thoroughly. Color will change into yellow immediately.
13. Read O.D. absorbance at 450 nm in a micro-plate reader immediately after adding the stop solution.

14. Calculation: Relative O.D. 450 = O.D. for each well – O.D. 450 control zero well. The Standard curve can be plotted as the relative O.D. 450 of each standard solution in Y axis *vs.* the respective concentration of the standard in X axis. Concentration of the samples can be incorporated from the standard curve. If the samples were diluted, multiply the dilution factor to the concentration.

Table-1

	Standard 1	Standard 2	3	4	5	6	7	8	9	10	11	12
A	250 pg/ml	250 pg/ml										
B	125 pg/ml	125 pg/ml										
C	62.5 pg/ml	62.5 pg/ml										
D	31.3 pg/ml	31.3 pg/ml										
E	15.6 pg/ml	15.6 pg/ml										
F	7.8 pg/ml	7.8 pg/ml										
G	3.9 pg/ml	3.9 pg/ml										
H	0 pg/ml	0 pg/ml										

IX. REFERENCES

1. Dendritic cell IL-1α and IL-1β are polyubiquitinated and degraded by the proteasome.
   PMID: 25371210

2. IL-1α and IL-1β recruit different myeloid cells and promote different stages of sterile inflammation.
   PMID: 21930960

3. IL (interleukin)-1alpha promotes nuclear factor-kappaB and AP-1-induced IL-8 expression, cell survival, and proliferation in head and neck squamous cell carcinomas.
   PMID: 11410524

4. Secreted IL-1α promotes T-cell activation and expansion of CD11b(+) Gr1(+) cells in carbon tetrachloride-induced liver injury in mice.
   PMID: 25870999

X. TROUBLE SHOOTING

Problem	Probable Cause	Suggestion
No signal	Forgot to add all components.	Prepare check list and add the components in the correct order.
Low signal	Not enough lysates per well.	Check the protein concentration. Add more lysates.
High background	Washing is not sufficient.	Wash plates thoroughly after incubation with Streptavidin-HRP secondary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