Human IL-1α ELISA Kit

Catalog Number
EK0487

For the quantitative determination of human interleukin 1 alpha (IL-1α) concentrations in cell culture supernates, serum, and plasma.

This instruction must be read in its entirety before using this product.
For research use only. Not for use in diagnostic procedures.

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PRINCIPLE OF THE ASSAY

This assay employs the quantitative sandwich enzyme immunoassay technique. A monoclonal antibody specific for IL-1 has been pre-coated onto a microplate. Standards and samples are pipetted into the wells and any IL-1 present is bound by the immobilized antibody. Following incubation unbound samples are removed during a wash step, and then a detection antibody specific for IL-1 is added to the wells and binds to the combination of capture antibody- IL-1 in sample. Following a wash to remove any unbound combination, and enzyme conjugate is added to the wells. Following incubation and wash steps a substrate is added. A coloured product is formed in proportion to the amount of IL-1 present in the sample. The reaction is terminated by addition of acid and absorbance is measured at 450nm. A standard curve is prepared from seven IL-1 standard dilutions and IL-1 sample concentration determined.

DETECTION RANGE

7.8 pg/ml - 500 pg/ml

SENSITIVITY

The minimum detectable dose was 4pg/mL.

SPECIFICITY

This assay recognizes both natural and recombinant human IL-1 . The factors listed below were prepared at 50ng/ml in Standard /sample Diluent and assayed for cross-reactivity and no significant cross-reactivity or interference was observed.

Table 1: Factors assayed for cross-reactivity

Recombinant human	Recombinant mouse	Other proteins
G-CSF	IL-1α□	bovine FGF acidic
GM-CSF	IL-1β□	bovine FGF basic
IL-1α□	IL-3	human PDGF
IL-1β□	IL-5	porcine PDGF
IL-2 sRα□	IL-6	human TGF-β1
IL-3	IL-7	porcine TGF-β1
IL-4	IL-9	rat TGF--β5

PRECISION

The coefficient of variation of both intra-assay and inter-assay were less than 10%.

MATERIALS PROVIDED

1. Aluminium pouches with a Microwell Plate coated with monoclonal antibody to human IL-1 (8×12)
2. 2 vials human IL-1 Standard lyophilized, 500 pg/ml upon reconstitution
3. 2 vials concentrated Biotin-Conjugate anti-human IL-1 monoclonal antibody
4. 2 vials Streptavidin-HRP solution,
5. 1 bottle Standard /sample Diluent
6. 1 bottle Biotin-Conjugate antibody Diluent
7. 1 bottle Streptavidin-HRP Diluent
8. 1 bottle Wash Buffer Concentrate 20x (PBS with 1% Tween-20)
9. 1 vial Substrate Solution
10. 1 vial Stop Solution
11. 3 pieces Adhesive Films
12. package insert

STORAGE

Table 2: Storage of the kit

<table>
<tr><td>Unopened Kit</td><td colspan="2">Store at 2 - 8° C. Do not use past kit expiration date.</td></tr>
<tr><td rowspan="10">Opened/ Reconstituted Reagents</td><td>Standard /sample Diluent</td><td rowspan="8">May be stored for up to 1 month at 2 - 8° C.**</td></tr>
<tr><td>Concentrated Biotin-Conjugate</td></tr>
<tr><td>Streptavidin-HRP solution</td></tr>
<tr><td>Biotin-Conjugate antibody Diluent</td></tr>
<tr><td>Streptavidin-HRP Diluent</td></tr>
<tr><td>Wash Buffer Concentrate 20x</td></tr>
<tr><td>Substrate Solution</td></tr>
<tr><td>Stop Solution</td></tr>
<tr><td>Standard</td><td>Aliquot and store for up to 1 month at ≤20°C.
Avoid repeated freeze-thaw cycles. Diluted standard shall not be reused.</td></tr>
<tr><td>Microplate Wells</td><td>Return unused wells to the</td></tr>
</table>

		foil pouch containing the desiccant pack, reseal along entire edge of zip-seal. May be stored for up to 1 month at 2 - 8° C.**

**Provided this is within the expiration date of the kit.

THE REQUIRED ITEMS (not provided, but can help to buy):

1. Microplate reader (450nm).
2. Micro-pipette and tips: 0.5-10, 2-20, 20-200, 200-1000ul.
3. 37 ℃ incubator, double-distilled water or deionized water, coordinate paper, graduated cylinder.

PRECAUTIONS FOR USE

1. Store kit regents between 2℃and 8℃. After use all reagents should be immediately returned to cold storage(2℃ to 8℃).
2. Please perform simple centrifugation to collect the liquid before use.
3. To avoid cross contamination, please use disposable pipette tips.
4. The Stop Solution suggested for use with this kit is an acid solution. Wear eye, hand, face, and clothing protection when using this material. Avoid contact of skin or mucous membranes with kit reagents or specimens. In the case of contact with skin or eyes wash immediately with water.
5. Use clean, dedicated reagent trays for dispensing the washing liquid, conjugate and substrate reagent. Mix all reagents and samples well before use.
6. After washing microtiter plate should be fully pat dried. Do not use absorbent paper directly into the enzyme reaction wells.
7. Do not mix or substitute reagents with those from other lots or other sources. Do not use kit reagents beyond expiration date on label.
8. Each sample, standard, blank and optional control samples should be assayed in duplicate or triplicate.
9. Adequate mixing is very important for good result. Use a mini-vortexer at the lowest frequency or Shake by hand at 10min interval when there

is no vortexer.

10. Avoid microtiter plates drying during the operation.
11. Dilute samples at the appropriate multiple, and make the sample values fall within the standard curve. If samples generate values higher than the highest standard, dilute the samples and repeat the assay.
12. Any variation in standard diluent, operator, pipetting technique, washing technique, incubation time and temperature, and kit age can cause variation in binding.
13. This method can effectively eliminate the interference of the soluble receptors, binding proteins and other factors in biological samples.

SAMPLE COLLECTION AND STORAGE

1. **Cell Culture Supernates** - Remove particulates by centrifugation.
2. **Serum** - Use a serum separator tube (SST) and allow samples to clot for 30 minutes before centrifugation for 15 minutes at approximately 1000 x g. Remove serum, avoid hemolysis and high blood lipid samples.
3. **Plasma** - Recommended EDTA as an anticoagulant in plasma. Centrifuge for 15 minutes at 1000 x g within 30 minutes of collection.
4. Assay immediately or aliquot and store samples at -20℃. Avoid repeated freeze-thaw cycles.
5. Dilute samples at the appropriate multiple (recommended to do pre-test to determine the dilution factor).
   Note: The normal human serum or plasma samples are suggested to make a 1:2 dilution.

REAGENT PREPARATION

1. Bring all reagents to room temperature before use.
2. **Wash Buffer** - Dilute 10mL of Wash Buffer Concentrate into deionized or distilled water to prepare 200mL of Wash Buffer. If crystals have formed in the concentrate Wash Buffer, warm to room temperature and mix gently until the crystals have completely dissolved.
3. **Standard** - Reconstitute the Standard with 1.0mL of Standard /sample Diluent. This reconstitution produces a stock solution of 500 pg /mL. Allow the standard to sit for a minimum of 15 minutes with gentle

agitation prior to making dilutions.

Pipette 500μL of Standard/sample Diluent into the 250 pg/mL tube and the remaining tubes. Use the stock solution to produce a 2-fold dilution series (below). Mix each tube thoroughly and change pipette tips between each transfer. The 250 pg/mL standard serves as the high standard. The Standard/ sample Diluent serves as the zero standard (0 pg/mL).

If you do not run out of re-melting standard, store it at -20℃. Diluted standard shall not be reused.

4. Working solution of Biotin-Conjugate anti-human IL-1 monoclonal antibody:
   Make a 1:100 dilution of the concentrated Biotin-Conjugate solution with the Biotin-Conjugate antibody Diluent in a clean plastic tube.

   The working solution should be used within one day after dilution.

5. Working solution of Streptavidin-HRP: Make a 1:100 dilution of the concentrated Streptavidin-HRP solution with the Streptavidin-HRP Diluent in a clean plastic tube.

   The working solution should be used within one day after dilution.

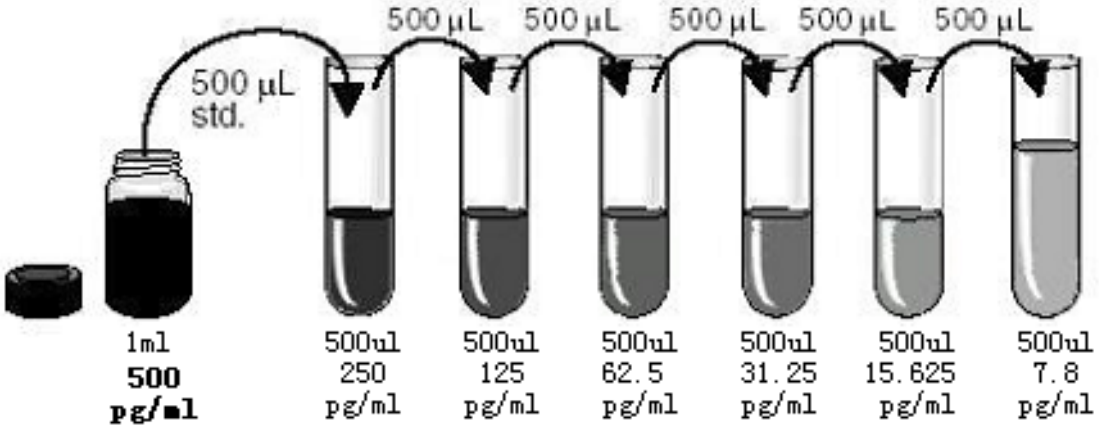

Figure 1: Preparation of IL-1• standard dilutions

GENERAL ELISA PROTOCOL

1. Prepare all reagents and working standards as directed in the previous sections.
2. Determine the number of microwell strips required to test the desired number of samples plus appropriate number of wells needed for running blanks and standards. Remove extra microwell strips from

holder and store in foil bag with the desiccant provided at 2-8℃ sealed tightly.

3. Add 100μL of Standard, control, or sample, per well. Cover with the adhesive strip provided. Incubate for 1.5 hours at 37℃.
4. Aspirate each well and wash, repeating the process three times for a total of four washes. Wash by filling each well with Wash Buffer (350μL) using a squirt bottle, manifold dispenser or auto-washer. Complete removal of liquid at each step is essential to good performance. After the last wash, remove any remaining Wash Buffer by aspirating or decanting. Invert the plate and blot it against clean paper towels.
5. Add 100 μL of the working solution of Biotin-Conjugate to each well. Cover with a new adhesive strip and incubate 1 hours at 37℃.
6. Repeat the aspiration/wash as in step 3.
7. Add 100 μL of the working solution of Streptavidin-HRP to each well. Cover with a new adhesive strip and incubate for 30 minutes at 37. Avoid placing the plate in direct light.
8. Repeat the aspiration/wash as in step 3.
9. Add 100 μL of Substrate Solution to each well. Incubate for 10-20 minutes at 37℃. Avoid placing the plate in direct light.
10. Add 100 μL of Stop Solution to each well. Gently tap the plate to ensure thorough mixing.
11. Determine the optical density of each well immediately, using a microplate reader set to 450 nm.(optionally 630nm as the reference wave length;610-650nm is acceptable)

ASSAY PROCEDURE SUMMARY

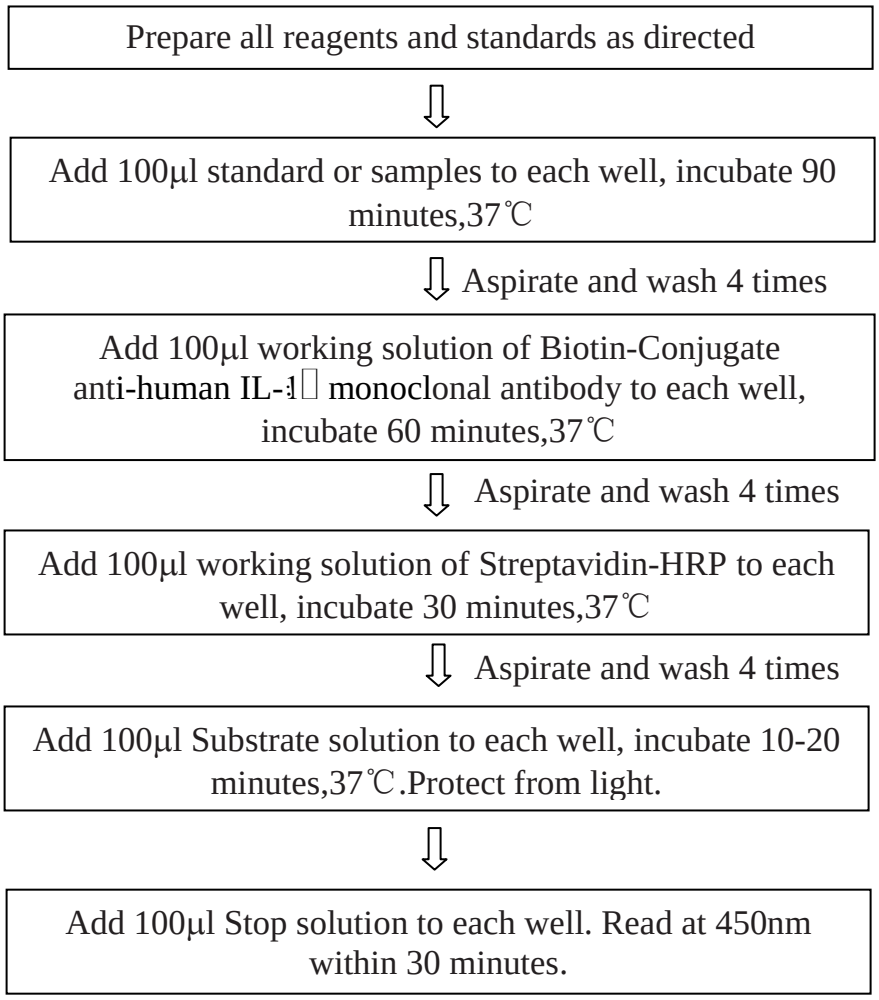

Figure 2: Assay procedure summary

TECHNICAL HINTS

1. When mixing or reconstituting protein solutions, always avoid foaming.
2. To avoid cross-contamination, change pipette tips between additions of each standard level, between sample additions, and between reagent additions. Also, use separate reservoirs for each reagent.
3. To ensure accurate results, proper adhesion of plate sealers during incubation steps is necessary.

4. Substrate Solution should remain colorless until added to the plate. Stop Solution should be added to the plate in the same order as the Substrate Solution. Keep Substrate Solution protected from light. Substrate Solution should change from colorless to gradations of blue.
5. A standard curve should be generated for each set of samples assayed. According to the content of tested factors in the sample, appropriate diluted or concentrated samples, it is best to do pre-experiment.

CALCULATION OF RESULTS

1. Average the duplicate readings for each standard, control, and sample and subtract the average zero standard optical density.
2. Create a standard curve by reducing the data using computer software capable of generating a four parameter logistic (4-PL) curve-fit. As an alternative, construct a standard curve by plotting the mean absorbance for each standard on the y-axis against the concentration on the x-axis and draw a best fit curve through the points on the graph.
3. The data may be linearized by plotting the log of the IL-1 concentrations versus the log of the O.D. and the best fit line can be determined by regression analysis. This procedure will produce an adequate but less precise fit of the data. If samples have been diluted, the concentration read from the standard curve must be multiplied by the dilution factor.
4. This standard curve is provided for demonstration only. A standard curve should be generated for each set of samples assayed.

Table 3:Typical data using the IL-1 ELISA (Measuring wavelength:450nm, Reference wavelength:630nm)

Standard (pg/ml)	OD.	OD.	Average	Corrected
0	0.020	0.025	0.023	——
7.8	0.098	0.089	0.094	0.110
15.625	0.163	0.168	0.166	0.177
31.25	0.315	0.318	0.317	0.307
62.5	0.589	0.598	0.594	0.552
125	1.005	1.012	1.009	0.986
250	1.593	1.582	1.588	1.624
500	1.986	1.991	1.989	1.982

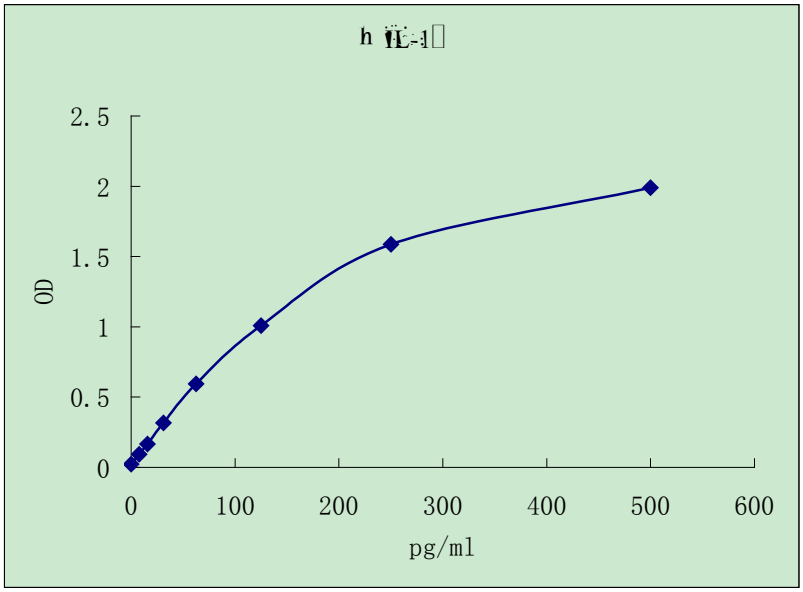

Figure 3:Representative standard curve for IL-1 ELISA. IL-1 was diluted in serial two-fold steps in Sample Diluent.

Do not use this standard curve to derive test results. A standard curve must be run for each group of microwell strips assayed.

BACKGROUND

Interleukin 1 (IL-1) is a name that designates two proteins, IL-1 and IL-1 , which are the products of distinct genes, but which recognize the same cell surface receptors. With the exception of skin keratinocytes, some epithelial cells, and certain cells of the central nervous system, IL-1 is not produced by the cells of healthy individuals. However, in response to stimuli such as those produced by inflammatory agents, infections, or microbial endotoxins, a dramatic increase in the production of IL-1 by macrophages and various other cell types is seen. For reviews on the properties and activities of IL-1 and IL-1 , see references 1 - 3.

IL-1 and IL-1 are structurally related polypeptides that show approximately 25% homology at the amino acid level (2). Both are synthesized as 31 kDa precursors that are subsequently cleaved into proteins with molecular weights of approximately 17.5 kDa (4, 5). Neither IL-1 nor IL-1 contains a typical hydrophobic signal peptide sequence (6 - 8), but evidence suggests that these factors can be secreted by non-classical pathways (9, 10). A large proportion of IL-1 is retained intracellularly in its precursor form (3). A portion of this unprocessed IL-1 is

transported to the cell surface and remains associated with the cell membrane (1, 3, 11). The membrane-bound, unprocessed IL-1 is apparently biologically active, acting in a paracrine fashion on adjacent cells having IL-1 receptors (1, 3). The precursor form of IL-1 , unlike the IL-1 precursor, shows little or no biological activity in comparison to the 17.5 kDa processed form (10 - 13). Intracellular IL-1 consists exclusively of the 31 kDa precursor form (5). Extracellular IL-1 consists of a mixture of both unprocessed and mature IL-1 . These results indicate that processing takes place subsequent to secretion and is not tightly coupled to secretion (5, 9, 10,14). The specific protease apparently responsible for the processing of IL-1 , designated interleukin1 -converting enzyme (ICE), has been described (14).

IL-1 and IL-1 exert their effects by binding to specific receptors. Two distinct receptor types have been isolated that bind both forms of IL-1. An 80 kDa membrane bound receptor protein, IL-1 receptor type I (IL-1 RI), has been isolated from T cells, fibroblasts, keratinocytes, endothelial cells, synovial lining cells, chondrocytes, and hepatocytes (1, 3, 15). IL-1 RI has been cloned from mouse and human cells (16) and found to be a member of the Ig super family. A second type of IL-1 receptor, IL-1 receptor type II (IL-1 RII), has been found on B cells, neutrophils, and bone marrow cells (1, 3). This receptor has an apparent molecular weight of about 68 kDa and is also a member of the Ig super family. The two IL-1 receptor types show approximately 28% homology in their extracellular domains, but differ significantly in that the type II receptor has a cytoplasmic domain of only 29 amino acid residues, whereas the type I receptor has a cytoplasmic domain of 213 amino acid residues (1, 16). In general, IL-1 binds better to the type I receptor and IL-1 binds better to the type II receptor (1). At present, the mechanisms involved in the transduction of the signal initiated by binding of IL-1 are not well characterized (1). IL-1 possesses a wide variety of biological activities. It has been shown to induce prostaglandin synthesis in endothelial cells and smooth muscle cells (17, 18). In the liver, IL-1 initiates the acute phase response resulting in an increase in hepatic protein synthesis and decreased albumin production (19).

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