Human IL-8 ELISA KIT

Catalog No: CDK035A
CDK035B

Quantity: 1 x 96 tests
2 x 96 tests

PRODUCT SPECIFICATIONS :

Specificity :	Recognizes both natural and recombinant human IL-8
Range :	62.5 pg/ml - 2000 pg/ml
Sensitivity :	< 25 pg/ml
Incubation :	1 h 40 min
Sample Types :	Serum Plasma Cell culture supernatant
Cross Reaction :	No cross reactivity with other human cytokines
Kit Content :	Pre-coated 12 strip plate, biotinylated secondary antibody, standards, controls, buffers, Streptavidin-HRP, TMB Substrate, Stop Reagent.

1. INTENDED USE

The Cell Sciences® IL-8 ELISA kit is a solid phase sandwich ELISA for the *in-vitro* qualitative and quantitative determination of IL-8 in supernatants, buffered solutions or serum and plasma samples. This assay will recognize both natural and recombinant human IL-8. **This kit has been configured for research only. Not suitable for use in diagnostic or therapeutic procedures.**

2. INTRODUCTION

2.1. Summary

Interleukin 8 (IL-8) or CXCL8, Monocyte-Derived Neutrophil Chemotactic Factor (MDNCF), Neutrophil Activating Factor (NAF) and NAD-P1 is a chemokine secreted by monocytes, macrophages and endothelial cells. IL-8 chemoattracts and activates neutrophils.

The predominant form of IL-8 is a 8.4 kDa protein containing 72 amino acid residues, which includes five additional N-Terminal amino-acids. IL-8 contains the four conserved cysteine residues present in CXC chemokines and also contains the “ELR” motif common to CXC chemokines that binds to CXCR1 and CXCR2.

Data indicates that IL-8 may participate in the pathogenesis of rheumatoid arthritis via the induction of neutrophil-mediated cartilage damage and psoriasis. A causative involvement of IL-8 is found within a broad range of clinico-pathological conditions: adult respiratory distress syndrome, asthma, bacterial infections, bladder cancer, graft rejection and influenza infection, due to the now known biological properties of IL-8. This cytokine, especially in combinations with other neutrophil activating agents, may prove helpful in the treatment of patients suffering from

granulocytopenia, severe infections against which antibiotics are not effective, and immunodeficiency caused by HIV.

2.2. Principle of the method

A capture antibody highly specific for IL-8 has been coated to the wells of the microtiter strip plate provided during manufacture. Binding of IL-8 samples and known standards to the capture antibodies and subsequent binding of the biotinylated anti- IL-8 secondary antibody to the analyte is completed during the same incubation period. Any excess unbound analyte and secondary antibody is removed. The HRP conjugate solution is then added to every well including the zero wells, following incubation excess conjugate is removed by careful washing. A chromogen substrate is added to the wells resulting in the progressive development of a blue colored complex with the conjugate. The color development is then stopped by the addition of acid turning the resultant final product yellow. The intensity of the produced colored complex is directly proportional to the concentration of IL-8 present in the samples and standards. The absorbance of the color complex is then measured and the generated OD values for each standard are plotted against expected concentration forming a standard curve. This standard curve can then be used to accurately determine the concentration of IL-8 in any sample tested.

3. REAGENTS PROVIDED AND RECONSTITUTION

Reagents (Store @ 2-8°C)	**Quantity** 1 x 96 well kit	**Reconstitution**
P: 96 well microtiter strip plate	1	Ready to use (Pre-coated).
A: Plastic plate covers	2	n/a
B: Standard: 2000 pg/ml	2	Reconstitute as directed on the vial (see Assay preparation, section 8).
C: Standard Diluent (Buffer)	1 (25 ml)	10x Concentrate, dilute in distilled water (see Assay preparation, section 8).
D: Standard Diluent (Human Serum)	1 (7.0 ml)	Ready to use.
E: Control	2	Reconstitute as directed on the vial (see Assay preparation, section 8).
F: Biotinylated anti-IL-8	1 (0.4 ml)	Dilute in Biotinylated Antibody Diluent (see Assay preparation, section 8).
G: Biotinylated Antibody Diluent	1 (7.0 ml)	Ready to use.
H: Streptavidin-HRP	2 (5 µl)	Add 0.5 ml of HRP Diluent prior to use (see Assay preparation, section 8).
I: HRP Diluent	1 (23 ml)	Ready to use.
J: Wash Buffer	1 (10 ml)	200x Concentrate dilute in distilled water (see Assay preparation, section 8).
K: TMB Substrate	1 (11 ml)	Ready to use.
L: H_2SO_4 stop reagent	1 (11 ml)	Ready to use.

4. MATERIALS REQUIRED BUT NOT PROVIDED

- Microtiter plate reader fitted with appropriate filters (450 nm required with optional 620 nm reference filter)
- Microplate washer or wash bottle
- 10, 50, 100, 200 and 1,000 µl adjustable single channel micropipettes with disposable tips
- 50-300 µl multi-channel micropipette with disposable tips
- Multichannel micropipette reagent reservoirs
- Distilled water
- Vortex mixer
- Miscellaneous laboratory plastic and/or glass, if possible sterile

5. STORAGE INSTRUCTIONS

Store kit reagents between 2 and 8°C. Immediately after use remaining reagents should be returned to cold storage (2-8°C). Expiration of the kit and reagents is stated on the box front labels. The expiration of the kit components can only be guaranteed if the components are stored properly, and if, in case of repeated use of one component, the reagent is not contaminated by the first handling.

6. SPECIMEN COLLECTION, PROCESSING AND STORAGE

Cell culture supernatants, human serum, plasma or other biological samples will be suitable for use in the assay. Remove serum from the clot or red cells, respectively, as soon as possible after clotting and separation.

Cell culture supernatants: Remove particulates and aggregates by spinning at approximately 1000 x g for 10 min.

Serum: Use pyrogen/endotoxin free collecting tubes. Serum should be removed rapidly and carefully from the red cells after clotting. Following clotting, centrifuge at approximately 1000 x g for 10 min and remove serum.

Plasma: EDTA, citrate and heparin plasma can be assayed. Spin samples at 1000 x g for 30 min to remove particulates. Harvest plasma.

Storage: If not analyzed shortly after collection, samples should be aliquoted (250-500 µl) to avoid repeated freeze-thaw cycles and stored frozen at -70°C. Avoid multiple freeze-thaw cycles of frozen specimens.

Recommendation: Do not thaw by heating at 37°C or 56°C. Thaw at room temperature and make sure that sample is completely thawed and homogeneous before use. When possible avoid use of badly hemolyzed or lipemic sera. If large amounts of particles are present these should be removed prior to use by centrifugation or filtration.

7. SAFETY AND PRECAUTIONS FOR USE

- Handling of reagents, serum or plasma specimens should be in accordance with local safety procedures, e.g.CDC/NIH Health manual: "Biosafety in Microbiological and Biomedical Laboratories" 1984
- The human serum included in this kit have been tested and found non reactive for HbsAg, anti HIV1 & 2 and anti VHC. Nevertheless, no known method can offer complete assurance that human blood derivatives will not transmit hepatitis, AIDS or other infections. Therefore handling of reagents, serum or plasma specimens should be in accordance with local safety procedures.
- Laboratory gloves should be worn at all times.

- Avoid any skin contact with H_2SO_4 and TMB. In case of contact, wash thoroughly with water.
- Do not eat, drink, smoke or apply cosmetics where kit reagents are used.
- Do not pipette by mouth.
- When not in use, kit components should be stored refrigerated or frozen as indicated on vials or bottle labels.
- All reagents should be warmed to room temperature before use. Lyophilized standards should be discarded after use.
- Once the desired number of strips has been removed, immediately reseal the bag to protect the remaining strips from deterioration.
- Cover or cap all reagents when not in use.
- Do not mix or interchange reagents between different lots.
- Do not use reagents beyond the expiration date of the kit.
- Use a clean disposable plastic pipette tip for each reagent, standard, or specimen addition in order to avoid cross contamination. For the dispensing of H_2SO_4 and substrate solution, avoid pipettes with metal parts.
- Use a clean plastic container to prepare the washing solution.
- Thoroughly mix the reagents and samples before use by agitation or swirling.
- All residual washing liquid must be drained from the wells by efficient aspiration or by decantation followed by tapping the plate forcefully on absorbent paper. Never insert absorbent paper directly into the wells.
- The TMB solution is light sensitive. Avoid prolonged exposure to light. Also, avoid contact of the TMB solution with metal to prevent color development. Warning TMB is toxic avoid direct contact with hands. Dispose of properly.
- If a dark blue color develops within a few minutes after preparation, this indicates that the TMB solution has been contaminated and must be discarded. Read absorbance within 1 hour after completion of the assay.
- When pipetting reagents, maintain a consistent order of addition from well-to-well. This will ensure equal incubation times for all wells.
- Follow incubation times described in the assay procedure.
- Dispense the TMB solution within 15 min of the washing of the microtiter plate.

8. ASSAY PREPARATION

Bring all reagents to room temperature before use.

8.1. Assay Design

Determine the number of microwell strips required to test the desired number of samples plus appropriate number of wells needed for running zeros and standards. Each sample, standard, zero and control should be tested in **duplicate**. Remove sufficient Microwell Strips for testing from the aluminum pouch immediately prior to use. Return any wells not required for this assay with desiccant to the pouch. Seal tightly and return to 2-8°C storage.

Example plate layout (example shown for a 6-point standard curve)

	Standards / Controls		Sample Wells									
	1	2	3	4	5	6	7	8	9	10	11	12
A	2000	2000										
B	1000	1000										
C	500	500										
D	250	250										
E	125	125										
F	62.5	62.5										
G	zero	zero										
H	Ctrl	Ctrl										

All remaining empty wells can be used to test samples in duplicate

8.2. Preparation of Wash Buffer

Dilute the (200x) wash buffer concentrate 200 fold with distilled water to give a 1x working solution. Pour entire contents (10 ml) of the Washing Buffer Concentrate into a clean 2,000 ml graduated cylinder. Bring final volume to 2,000 ml with glass-distilled or deionized water. Mix gently to avoid foaming. Transfer to a clean wash bottle and store at 2°-25°C.

8.3. Preparation of Standard Diluent Buffer

Add the contents of the vial (10x concentrate) to 225ml of distilled water before use.

This Solution can be stored at 2-8°C for up to 1 week.

8.4. Preparation of Standard

Depending on the type of samples you are assaying, the kit may include two standard diluents. Because biological fluids might contain proteases or cytokine-binding proteins that could modify the recognition of the cytokine you want to measure, you should reconstitute standard vials with the most appropriate Standard Diluent.

For **serum and plasma** samples: use Standard Diluent - human serum
For **cell culture supernatants**: use Standard Diluent Buffer

Standard vials must be reconstituted with the volume of standard diluent shown on the vial immediately prior to use. This reconstitution gives a stock solution of 2000 pg/ml of IL-8. Mix the reconstituted standard gently by repeated aspirations/ejections. Serial dilutions of the standard are made directly in the assay plate to provide the concentration range from 2000 to 62.5 pg/ml. A fresh standard curve should be produced for each new assay.

· Immediately after reconstitution add 200 µl of the reconstituted standard to well's A1 and A2, which provides the highest concentration standard at 2000 pg/ml.

· Add 100 µl of appropriate standard diluent to the remaining standard wells B1 and B2 to F1 and F2

· Transfer 100 µl from wells A1 and A2 to B1 and B2. Mix the well contents by repeated aspirations and ejections taking care not to scratch the inner surface of the wells

· Continue this 1:1 dilution using 100 µl from wells B1 and B2 through to wells F1 and F2 providing a serial diluted standard curve ranging from 2000 pg/ml to 62.5 pg/ml

· Discard 100 µl from the final wells of the standard curve (F1 and F2)

Alternatively these dilutions can be performed in separate clean tubes and immediately transferred directly into the relevant wells.

8.5. Preparation of Controls

Freeze-dried control vials should also be reconstituted with the most appropriate Standard Diluent to your samples.

For serum and plasma samples: use Standard Diluent - human serum
For cells culture supernatants: use Standard Diluent Buffer

The supplied Controls must be reconstituted with the volume of Standard Diluent indicated on the vial. Reconstitution of the freeze-dried material with the indicated volume, will give a solution at the concentration stated on the vial. Do not store after use.

8.6. Preparation of Biotinylated anti-IL-8

It is recommended this reagent is prepared immediately before use. Dilute the biotinylated anti-IL-8 with the biotinylated antibody diluent in an appropriate clean glass vial using volumes appropriate to the number of required wells. Please see example volumes below:

Number of wells required	Biotinylated Antibody (µl)	Biotinylated Antibody Diluent (µl)
16	40	1060
24	60	1590
32	80	2120
48	120	3180
96	240	6360

8.7. Preparation of Streptavidin-HRP

It is recommended to centrifuge vial for a few seconds in a microcentrifuge to collect all the volume at the bottom.

Dilute the 5 µl vial with 0.5 ml of HRP diluent **immediately before use.** Do-not keep this diluted vial for future experiments. Further dilute the HRP solution to volumes appropriate for the number of required wells in a clean glass vial. Please see example volumes below:

Number of wells required	Streptavidin-HRP (µl)	Streptavidin-HRP Diluent (ml)
16	30	2
24	45	3
32	60	4
48	75	5
96	150	10

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9. METHOD

We strongly recommend that every vial is mixed without foaming prior to use. Prepare all reagents as shown in section 8. Note: final preparation of Biotinylated Secondary Antibody (section 8.6) and Streptavidin-HRP section8.7) should occur immediately before use.

Assay Step		Details
1.	Addition	**Prepare Standard curve** as shown in section 8.4 above
2.	Addition	Add 100µl of each, **Sample, Standard, Control and zero (appropriate standard diluent)** in duplicate to appropriate number of wells
3.	Addition	Add 50µl of diluted **biotinylated anti-IL-8** to all wells
4.	Incubation	Cover with a plastic plate cover and incubate at room temperature (18 to 25°C) for **1 hour**
5.	Wash	Remove the cover and wash the plate as follows: a) Aspirate the liquid from each well b) Dispense 0.3 ml of **1x washing solution** into each well c) Aspirate the contents of each well d) Repeat step b and c another two times
6.	Addition	Add 100µl of **Streptavidin-HRP** solution into all wells
7.	Incubation	Cover with a plastic plate cover and incubate at room temperature (18 to 25°C) for **30 min**
8.	Wash	Repeat wash step 5.
9.	Addition	Add 100µl of ready-to-use **TMB Substrate Solution** into all wells
10.	Incubation	Incubate in the dark for **12-15 minutes*** at room temperature. Avoid direct exposure to light by wrapping the plate in aluminium foil.
11.	Addition	Add 100µl of **H_2SO_4:Stop Reagent** into all wells
Read the absorbance value of each well (immediately after step 11.) on a spectrophotometer using 450 nm as the primary wavelength and optionally 620 nm as the reference wave length (610 nm to 650 nm is acceptable).		

**Incubation time of the substrate solution is usually determined by the ELISA reader performance. Many ELISA readers only record absorbance up to 2.0 O.D. Therefore the colour development within individual microwells must be observed by the analyst, and the substrate reaction stopped before positive wells are no longer within recordable range.*

10. DATA ANALYSIS

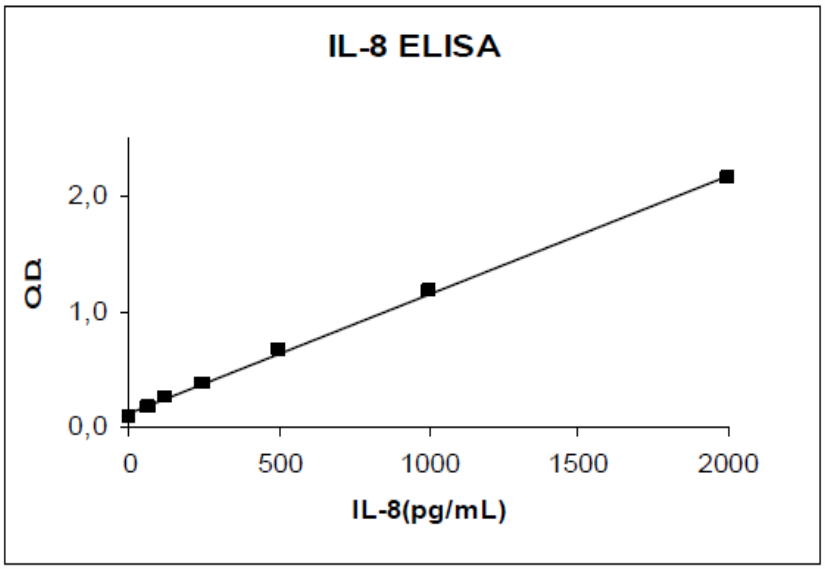
Calculate the average absorbance values for each set of duplicate standards, controls and samples. Ideally duplicates should be within 20% of the mean.

Generate a linear standard curve by plotting the average absorbance of each standard on the vertical axis versus the corresponding IL-8 standard concentration on the horizontal axis.

The amount of IL-8 in each sample is determined by extrapolating OD values against IL-8 standard concentrations using the standard curve.

Example IL-8 Standard Curve

Standard	IL-8 Conc	OD (450nm) mean	CV (%)
1	2000	2.154	1.22
2	1000	1.173	1.03
3	500	0.663	2.53
4	250	0.378	5.16
5	125	0.249	4.01
6	62.5	0.174	5.79
zero	0	0.086	7.55



Note: Curve shown above should not be used to determine results. Every laboratory must produce a standard curve for each set of microwell strips assayed.

11. ASSAY LIMITATIONS

Do not extrapolate the standard curve beyond the maximum standard curve point. The dose-response is non-linear in this region and good accuracy is difficult to obtain. Concentrated samples above the maximum standard concentration must be diluted with Standard diluent or with your own sample buffer to produce an OD value within the range of the standard curve. Following analysis of such samples always multiply results by the appropriate dilution factor to produce actual final concentration.

The influence of various drugs on end results has not been investigated. Bacterial or fungal contamination and laboratory cross-contamination may also cause irregular results.

Improper or insufficient washing at any stage of the procedure will result in either false positive or false negative results. Completely empty wells before dispensing fresh Washing Buffer, fill with Washing Buffer as indicated for each wash cycle and do not allow wells to sit uncovered or dry for extended periods.

Disposable pipette tips, flasks or glassware are preferred, reusable glassware must be washed and thoroughly rinsed of all detergents before use.

As with most biological assays conditions may vary from assay to assay therefore **a fresh standard curve must be prepared and run for every assay.**

12. PERFORMANCE CHARACTERISTICS

12.1. Sensitivity

The sensitivity, minimum detectable dose of IL-8 using this Cell Sciences® IL-8 ELISA kit was found to be **29 pg/ml**. This was determined by adding 3 standard deviations to the mean OD obtained when the zero standard was assayed 30 times.

12.2. Specificity

The assay recognizes both natural and recombinant human IL-8. To define the specificity of this ELISA several proteins were tested for cross reactivity. There was no cross reactivity observed for any protein tested (IL-1α, IL-1β, IL-10 IL-12, IFNγ, IL-2, IL-6, TNFα, IL-4 and IL-13).

12.3. Precision

Intra-assay

Reproducibility within the assay will be evaluated in three independent experiments. Each assay will be carried out with 6 replicates (3 duplicates) of 3 spiked serum or human pooled serum samples and 2 supernatants containing different concentrations of IL-8. **The overall intra-assay coefficient of variation has been calculated to be 3.1%.**

Session	Sample	Assay 1 IL-8 pg/ml	Assay 2 IL-8 pg/ml	Assay 3 IL-8 pg/ml	Mean IL-8 pg/ml	SD	CV %
1	1	1647	1619	1646	1637	16	1.0
	2	985	962	984	977	13	1.3
	3	805	779	719	768	44	5.8
	4	1444	1481	1447	1457	21	1.4
	5	883	864	853	867	15	1.8
2	1	1638	1491	1403	1511	119	7.9
	2	855	873	841	856	16	1.9
	3	684	686	669	680	9	1.4
	4	1300	1262	1312	1291	26	2.0
	5	778	745	788	770	22	2.9
3	1	1599	1468	1496	1521	29	4.5
	2	1019	996	1058	1024	69	3.1
	3	735	668	694	699	31	4.8
	4	1355	1294	1401	1350	34	3.9
	5	792	775	816	794	54	2.6

Inter-assay

Assay to assay reproducibility within one laboratory will be evaluated in three independent experiments by two technicians. Each assay will be carry out with 6 replicates of 3 spiked serum human pooled serum samples and 2 supernatants containing different concentration of IL-8. **The calculated overall coefficient of variation was 9.7%.**

Technician	Session	Sample 1 IL-8 pg/ml	Sample 2 IL-8 pg/ml	Sample 3 IL-8 pg/ml	Sample 4 IL-8 pg/ml	Sample 5 IL-8 pg/ml
A	1	1874	1166	809	1668	1001
		1824	1180	852	1690	989
		1853	1154	875	1632	995
	2	1929	1090	770	1578	969
		1784	1089	828	1669	906
		1796	1111	855	1671	922
	3	1770	905	762	1594	923
		1713	898	806	1592	895
		1734	908	825	1552	946
B	1	1647	985	805	1444	883
		1619	962	779	1481	864
		1646	984	719	1447	853
	2	1638	855	684	1300	778
		1491	873	686	1262	745
		1403	841	669	1312	788
	3	1599	1019	735	1355	792
		1468	996	668	1294	775
		1496	1058	694	1401	816
Mean IL-8 pg/ml		1682	1004	768	1497	880
SD		152	111	69	149	83
CV %		9.0	11.0	8.9	9.9	9.4

12.4. Dilution Parallelism

Four human pooled serum samples with different levels of IL-8 were analyzed at different serial two fold dilutions (1:2 To 1:8) with two replicates each. Recoveries ranged from 77 to 105% with an overall **mean recovery of 88%.**

12.5. Spike Recovery

The spike recovery was evaluated by spiking 3 concentrations of IL-8 in human serum in 3 separate experiments. Recoveries ranged from 96 to 110% with an overall **mean recovery of 102%**

12.6. Stability

Storage Stability

Aliquots of spiked serum samples were stored at -20°C, 2-8°C, room temperature (RT) and at 37°C and the IL-8 level determined after 24h. There was no significant loss of IL-8 reactivity during storage at RT, 2-8°C and 37°C.

Freeze-thaw Stability

Aliquots of spiked serum were stored frozen at -20°C and thawed up to 5 times and the IL-8 level was determined. There was a decrease in activity of IL-8 after 5 cycles of freezing and thawing.

12.7. Expected serum values

A panel of 20 human sera were tested for IL-8. 18 were below the detection level of 29 pg/ml. Two samples reported results of 143 pg/ml and 197 pg/ml.

12.8. Standard Calibration

This immunoassay is calibrated against the International Reference Standard NIBSC 89/520. NIBSC 89/520 is quantitated in International Units, and equivalence in ng/ml is indicated. 1ng NIBSC corresponding to 1ng Cell Sciences® IL-8.

13. ASSAY SUMMARY

Total procedure length: 1h45mn

Add 100 µl of sample and diluted standard/controls and 50µl Biotinylated anti-IL-8

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Incubate 1 hours at room temperature

↓

Wash three times

↓

Add 100µl of Streptavidin-HRP

↓

Incubate 30min at room temperature

↓

Wash three times

↓

Add 100µl of ready-to-use TMB
Protect from light. Let the color develop for 12-15 mn.

↓

Add 100µl H_2SO_4

↓

Read Absorbance at 450 nm

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