PRODUCT INFORMATION & MANUAL

Human IL-8/CXCL8 Valukine™ ELISA

Catalog Number: VAL103

For the quantitative determination of natural and recombinant human IL-8/CXCL8 concentrations

For research use only.
Not for diagnostic or therapeutic procedures.

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Please refer to the kit label for expiry date.
Novus kits are guaranteed for 3 months from date of receipt

Version 202604.8

TABLE OF CONTENTS

I. BACKGROUND 2

II. OVERVIEW 4

III. ADVANTAGES 5

IV. EXPERIMENT 10

V. KIT COMPONENTS AND STORAGE 11

VI. PREPARATION 14

VII. ASSAY PROCEDURE 16

VIII. REFERENCES 17

I. BACKGROUND

Interleukin-8 (IL-8; also known as GCP-1, NAP-1, and CXCL8) is a heparin-binding, 8-9 kDa member of the alpha, or CXC family of chemokines. Currently, there are 15 human CXC family members that generally range from 8-12 kDa in size. The majority are found on human chromosome 4, all contain a typical three β-sheet/one α-helix structure, and most show an N-terminal Glu-Leu-Arg (ELR) tri-peptide motif (1-3). Human IL-8 is synthesized as a 99 amino acid (aa) precursor that contains a 20 aa signal sequence plus a 79 aa mature region (4-6). It circulates as a monomer, homodimer, and heterodimer with CXCL4/PF4. The monomer is considered the most bio-active, while the heterodimer is proposed to potentiate PF4 activity (7-10). Mature human IL-8 shares 65% and 70% aa sequence identity with porcine and canine IL-8, respectively (11, 12). There is no IL-8 gene counterpart in rodents. Multiple isoforms of IL-8 exist that are generated through both alternative splicing and differential proteolytic processing. Alternative splicing occurs at the C-terminus where there is an 11 aa substitution for amino acids 92-99 (13). Proteolytic processing is likely a cell-specific event and results in IL-8 N-terminal truncation. For example, fibroblasts and endothelial cells cleave amino acids 21 and 22, generating IL-8 (1-7), while monocytes and lymphocytes cleave amino acids 21-25, generating IL-8 (6-7). These short forms generally show increased bioactivity, particularly towards the CXCR1 IL-8 receptor (6, 14). Approximately 15% of IL-8 also undergoes citrullination on Arg27 of the precursor. This creates an IL-8 with an increased half-life and ability to induce leukocytosis (15, 16). A wide variety of cells secrete IL-8, and these include monocytes and neutrophils (17), fibroblasts and keratinocytes (18), mast cells (19), visceral smooth muscle cells (20), dendritic cells (21), type II Greater alveolar cells (22), and endothelial cells (23).

There are two G-protein-coupled receptors for IL-8, termed CXCR1/IL-8 RA and CXCR2/IL-8 RB, that share 77% aa sequence identity (24). CXCR1 is 45-50 kDa in size and used almost exclusively by IL-8. CXCR2 is 35-40 kDa in size and used by almost all CXC chemokines (25, 26). Both CXCR1 and CXCR2 constitutively homodimerize, and this appears to be their functional configuration. When expressed on the same cell, heterodimerization will also occur, but this configuration undergoes disassembly following IL-8 binding (27). CXCR2 responds to low concentrations of IL-8 and is principally associated with chemotaxis and MMP-9 release. CXCR1, by contrast, responds to high concentrations of IL-8 and is associated with respiratory burst and

phospholipase D2 activation (26). Thus, and in the case of neutrophils, CXCR2 is suggested to initiate PMN migration to an inflammatory site followed by CXCR1 mediated priming for anti-microbial activity.

IL-8 is perhaps best known for its proinflammatory effects on immune cells. In essence, IL-8 is secreted by multiple cell types exposed to inflammatory stimuli. For monocytes/macrophages, microbial exposure results in IL-8 release. This is followed by CXCR2-mediated chemotaxis of PMNs to sites of antigenic challenge, and their subsequent activation/priming for anti-microbial activity. This activity is complemented by IL-8's ability to potentiate M-CSF action in the bone marrow that results in the release and maturation of granulocytes (14). IL-8 is also reported to have an angiogenic effect on tumor-associated endothelial cells. Here, tumor-derived IL-8 can act in a paracrine manner to activate CXCR1 and R2 on endothelial cells. Both receptors have been associated with PI3-K/Akt and RasGTP signaling, resulting in cell survival and proliferation. In addition, IL-8 positively regulates VEGF R2 and EGF R, two TKRs that mediate cell growth and migration (28).

II. OVERVIEW

A. PRINCIPLE OF THE ASSAY

This assay employs the quantitative sandwich enzyme immunoassay technique. An antibody specific for human IL-8 has been pre-coated onto a microplate. Standards and samples are pipetted into the wells and any human IL-8 present is bound by the immobilized antibody. After washing away any unbound substances, an enzyme-linked antibody specific for human IL-8 is added to the wells. Following a wash to remove any unbound antibody-enzyme reagent, TMB substrate (Chromogenic agent) is added to the wells and color develops in proportion to the amount of human IL-8 bound in the initial step. The color development is stopped and the intensity of the color is measured.

B. LIMITATIONS OF THE PROCEDURE

- **FOR RESEARCH USE ONLY. NOT FOR USE IN DIAGNOSTIC PROCEDURES.**
- This kit is suitable for cell culture supernate, human serum and human plasma.
- The kit should not be used beyond the expiration date on the kit label.
- Do not mix or substitute reagents with those from other lots or sources.
- If samples generate values higher than the highest standard, dilute the samples with Calibrator Diluent (1×) / RD6Z and repeat the assay.
- Any variation in operator, pipetting technique, washing technique, incubation time or temperature, and kit age can cause variation in binding.

III. ADVANTAGES

A. PRECISION

Intra-assay Precision (Precision within an assay)

Three samples were tested twenty times on one plate to assess intra-assay precision.

Inter-assay Precision (Precision between assays)

Three samples were tested in twenty separate assays to assess inter-assay precision.

CELL CULTURE SUPERNATE ASSAY

	Intra-assay Precision			**Inter-assay Precision**		
Sample	1	2	3	1	2	3
Mean (pg/mL)	115	386	802	132	410	817
Standard Deviation	5.3	17.0	37.9	10.7	28.0	42.4
CV%	4.6	4.4	4.7	8.1	6.8	5.2

SERUM/PLASMA ASSAY

	Intra-assay Precision			**Inter-assay Precision**		
Sample	1	2	3	1	2	3
Mean (pg/mL)	168	526	1093	196	581	1160
Standard Deviation	9.4	28.6	70.7	14.5	56.6	70.2
CV%	5.6	5.4	6.5	7.4	9.7	6.1

B. RECOVERY

The recovery of Human IL-8 spiked to levels throughout the range of the assay in various matrices was evaluated.

Sample Type	Average % Recovery	Range (%)
Cell culture media (n=5)	98	85 - 114
Human serum (n=5)	98	88 - 106
Human EDTA plasma (n=5)	103	97 - 111
Human heparin plasma (n=5)	102	92 - 107
Human citrate plasma (n=5)	105	95 - 114

C. SENSITIVITY

Fifty-three assays were evaluated and the minimum detectable dose (MDD) of human IL-8 ranged from 1.5-7.5 pg/mL. The mean MDD was 3.5 pg/mL.

The MDD was determined by adding two standard deviations to the mean optical density value of twenty zero standard replicates and calculating the corresponding concentration.

D. CALIBRATION

This immunoassay is calibrated against a highly purified *E. coli*-expressed 72 amino acid (monocyte) form of recombinant human IL-8 produced at R&D Systems.

The NIBSC/WHO 1st International Standard 89/520 was evaluated in this kit. The dose response curve of this standard parallels the Valukine standard curve. To convert sample values obtained with the Valukine Human IL-8/CXCL8 kit to approximate NIBSC International Units, use the equation below.

NIBSC (89/520) approximate value (IU/mL) = 0.001 × Valukine Human IL-8 value (pg/mL)

E. LINEARITY

To assess the linearity of the assay, samples were containing or spiked with high concentrations of Human IL-8 in various matrices and diluted with Calibrator Diluent (1×) / RD6Z to produce samples with values within the dynamic range of the assay.

Dilution		Cell culture media (n=4)	Human serum (n=4)	Human EDTA plasma (n=4)	Human heparin plasma (n=4)	Human citrate plasma (n=4)
1:2	Average % of Expected	96	95	93	93	93
	Range (%)	93 - 99	93 - 98	89 - 97	89 - 97	87 - 96
1:4	Average % of Expected	100	94	94	95	92
	Range (%)	99 - 101	91 - 103	89 - 98	89 - 98	86 - 100
1:8	Average % of Expected	104	94	94	94	91
	Range (%)	93 - 110	90 - 110	89 - 105	89 - 106	83 - 104
1:16	Average % of Expected	106	93	95	94	91
	Range (%)	95 - 116	84 - 101	89 - 103	86 - 102	83 - 101

F. SAMPLE VALUES

Human serum/plasma - Thirty-four samples from apparently healthy volunteers were evaluated for the presence of human IL-8 in this assay. All samples measured less than the lowest human IL-8 standard, 31.3 pg/mL. No medical histories were available for the donors used in this study.

Cell Culture Supernates - Human peripheral blood mononuclear cells (1×10^6 cells/mL) were cultured in RPMI supplemented with 10% fetal bovine serum, 50 µM β-mercaptoethanol, 2 mM L-glutamine, 100 U/mL penicillin, and 100 µg/mL streptomycin sulfate and stimulated with 10 µg/mL PHA. Aliquots of the culture supernate were removed on days 1 and 5 and assayed for levels of human IL-8.

Condition	Day 1 (pg/mL)	Day 5 (pg/mL)
Unstimulated	27,000	33,000
Stimulated	73,000	102,000

G. SPECIFICITY

This assay recognizes both natural and recombinant human IL-8.

The following factors were prepared at 50 ng/mL and assayed for cross-reactivity. Preparations of the following factors at 50 ng/mL in a mid-range rhIL-8 control were assayed for interference. No significant cross-reactivity or interference was observed.

Recombinant human		**Recombinant mouse**
ANG	IL-7	GM-CSF
AR	IL-9	IL-1α
CNTF	IL-10	IL-1β
β-ECGF	IL-11	IL-3
EGF	IL-12	IL-4
Epo	IL-13	IL-5
FGF acidic	IP-10	IL-5 Rα
FGF basic	KGF	IL-6
FGF-4	LAP (TGF-β1)	IL-7
FGF-5	LIF	IL-9
FGF-6	M-CSF	IL-10
G-CSF	MCP-1	IL-13
GM-CSF	MCP-2	KC
GROα	MCP-3	LIF
GROβ	MIP-1α	MIP-1α
GROγ	MIP-1β	MIP-1β
gp130	β-NGF	SCF
HB-EGF	OSM	TNF-α
HGF	PD-ECGF	**Recombinant amphibian**

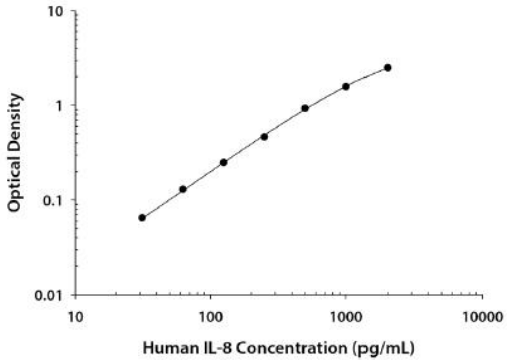
Recombinant human		**Recombinant mouse**
I-309	PDGF-AA	TGF-β5
IFN-γ	PDGF-AB	**Natural proteins**
IGF-I	PDGF-BB	bovine FGF acidic
IGF-II	PF-4	bovine FGF basic
IL-1α	PTN	human PDGF
IL-1β	RANTES	porcine PDGF
IL-1ra	SCF	human TGF-β1
IL-1 RI	SLPI	porcine TGF-β1
IL-1 RII	TGF-α	porcine TGF-β2
IL-2	TGF-β1	
IL-2 Rα	TGF-β3	
IL-3	TGF-β RII	
IL-3 Rα	TNF-α	
IL-4 R	TNF-β	
IL-5	TNF RI	
IL-5 Rβ	TNF RII	
IL-6	VEGF	
IL-6 R		

IV. EXPERIMENT

EXAMPLE STANDARD

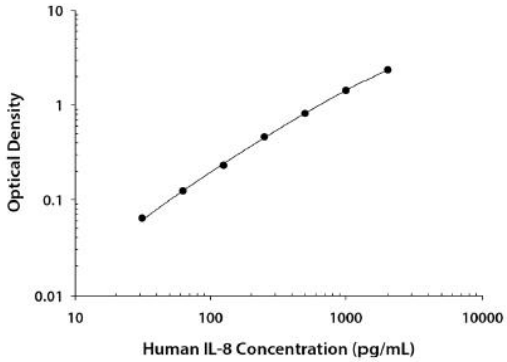
The standard curve is provided for demonstration only. A standard curve should be generated for each set of samples assayed.

CELL CULTURE SUPERNATE ASSAY



(pg/mL)	O.D.	Average	Corrected
0	0.099 0.101	0.100	—
31.3	0.164 0.166	0.165	0.065
62.5	0.227 0.232	0.230	0.130
125	0.347 0.350	0.349	0.249
250	0.559 0.570	0.564	0.464
500	1.025 1.036	1.030	0.930
1000	1.662 1.681	1.671	1.571
2000	2.588 2.606	2.597	2.497

SERUM/PLASMA ASSAY



(pg/mL)	O.D.	Average	Corrected
0	0.048 0.050	0.049	—
31.3	0.111 0.114	0.113	0.064
62.5	0.170 0.175	0.173	0.124
125	0.275 0.285	0.280	0.231
250	0.509 0.512	0.511	0.462
500	0.836 0.893	0.865	0.816
1000	1.451 1.503	1.477	1.428
2000	2.387 2.416	2.402	2.353

V. KIT COMPONENTS AND STORAGE

A. MATERIALS PROVIDED

Parts	Description	Size
Human IL-8 Microplate	96 well polystyrene microplate (12 strips of 8 wells) coated with an antibody against human IL-8	1 plate
Human IL-8 Conjugate	Solution of antibody against human IL-8 conjugated to horseradish peroxidase	1 vial
Human IL-8 Standard	Recombinant human IL-8 in a buffered protein base; lyophilized. Refer to the vial label for reconstitution volume	2 vials
Assay Diluent RD1-85	A buffered protein base with preservatives	1 vial
Calibrator Diluent (5×)/RD5P	A 5× concentrated buffered protein base used to dilute standard and samples. *For cell culture supernate samples.*	1 vial
Calibrator Diluent RD6Z	A buffered protein base used to dilute standard and samples. *For human serum/ plasma samples.*	1 vial
Wash Buffer Concentrate (25×)	A 25× concentrated solution of buffered surfactant	1 vial
TMB Substrate	TMB ELISA Substrate Solution/ TMB Substrate Solution	2 vials
Stop Solution	2 N sulfuric acid	1 vial
Plate Sealers	Adhesive strip	3 strips

B. STORAGE

<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="8">Opened/
Reconstituted
Reagents</td><td>Wash Buffer (1×)</td><td rowspan="6">May be stored for up to 1 month at 2-8°C.*</td></tr>
<tr><td>Stop Solution</td></tr>
<tr><td>Conjugate</td></tr>
<tr><td>TMB Substrate</td></tr>
<tr><td>Assay Diluent RD1-85</td></tr>
<tr><td>Calibrator Diluent RD6Z</td></tr>
<tr><td>Standard</td><td>Use a new standard for each assay.
Discard after use.</td></tr>
<tr><td>Calibrator Diluent (5×)/RD5P</td><td>May be stored for up to 1 month at 2-8 °C.*
Use and discard diluted Calibrator Diluent (1×). Prepare fresh for each assay.</td></tr>
<tr><td>Microplate Wells</td><td>Return unused wells to the 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.*</td></tr>
</table>

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

C. OTHER SUPPLIES REQUIRED

- Microplate reader capable of measuring absorbance at 450 nm, with the correction wavelength set at 540 nm or 570 nm.
- Pipettes and pipette tips.
- Deionized or distilled water.
- Squirt bottle, manifold dispenser, or automated microplate washer.
- 500 mL graduated cylinder.

D. PRECAUTION

- IL-8 is detectable in saliva. Take precautionary measures to prevent contamination of kit reagents while running this assay.
- The Stop Solution provided with this kit is an acid solution.
- Some components in this kit contain a preservative which may cause an allergic skin reaction. Avoid breathing mist.
- Wear protective gloves, clothing, eye, and face protection. Wash hands thoroughly after handling.

VI. PREPARATION

A. SAMPLE COLLECTION AND STORAGE

The sample collection and storage conditions listed below are intended as general guidelines. Sample stability has not been evaluated.

Cell Culture Supernates - Remove particulates by centrifugation and assay immediately or aliquot and store samples at ≤ -20°C. Avoid repeated freeze-thaw cycles. Samples may require dilution with Calibrator Diluent (1×).

Serum - Use a serum separator tube (SST) and allow samples to clot for 30 minutes at room temperature before centrifugation for 15 minutes at 1000 × g. Remove serum and assay immediately or aliquot and store samples at ≤ -20°C. Avoid repeated freeze-thaw cycles. Samples may require dilution with Calibrator Diluent RD6Z.

Plasma - Collect plasma using EDTA, heparin, or citrate as an anticoagulant. Centrifuge for 15 minutes at 1000 × g within 30 minutes of collection. Assay immediately or aliquot and store samples at ≤ -20°C. Avoid repeated freeze-thaw cycles. Samples may require dilution with Calibrator Diluent RD6Z.

B. SAMPLE PREPARATION

Cell culture supernate samples may require up to a 100-fold dilution prior to assay. A suggested 100-fold dilution is 10 µL of sample + 990 µL of Calibrator Diluent (1×). Optimal dilutions should be determined by the end user.

C. REAGENT PREPARATION

Bring all reagents to room temperature before use.
Note: *High concentrations of human IL-8 are found in human saliva. It is recommended that a face mask and gloves be used to protect kit reagents from contamination.*

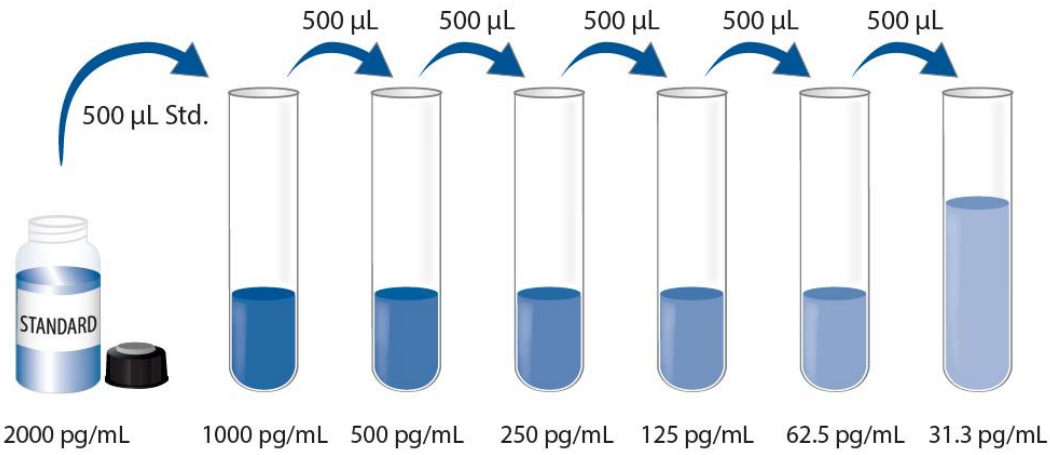
Wash Buffer (1×) - If crystals have formed in the concentrate, warm to room temperature and mix gently until the crystals have completely dissolved. Dilute 20 mL of Wash Buffer Concentrate (25×) into deionized or distilled water to prepare 500 mL of Wash Buffer (1×).

Calibrator Diluent (1×) - Use deionized or distilled water to prepare Calibrator Diluent (1×). Add 20 mL of Calibrator Diluent (5×)/RD5P to 80 mL of deionized or distilled water to prepare 100 mL of Calibrator Diluent (1×).

Human IL-8 Standard - **Refer to the vial label for the reconstitution volume*.** Reconstitute the Human IL-8 Standard with Calibrator Diluent (1×) (*for cell culture supernate samples*) or Calibrator Diluent RD6Z (*for human serum/plasma samples*). This reconstitution produces a stock solution of 2000 pg/mL. Allow the standard to sit for a minimum of 15 minutes with gentle agitation prior to making dilutions.

*If you have any question, please seek help from our Technical Support.

Pipette 500 µL of Calibrator Diluent (1×) (*for cell culture supernate samples*) or Calibrator Diluent RD6Z (*for human serum/plasma samples*) into each tube. Use the stock solution to produce a dilution series (below). Mix each tube thoroughly before the next transfer. The undiluted Human IL-8 Standard (2000 pg/mL) serves as the high standard. The appropriate calibrator diluent serves as the zero standard (0 pg/mL).



D. TECHNICAL HINTS

- When mixing or reconstituting protein solutions, always avoid foaming.
- 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.
- To ensure accurate results, proper adhesion of plate sealers during incubation steps is necessary.
- TMB Substrate should remain colorless until added to the plate. Keep TMB Substrate protected from light. TMB Substrate should change from colorless to gradations of blue.
- Stop Solution should be added to the plate in the same order as the TMB Substrate. The color developed in the wells will turn from blue to yellow upon addition of the Stop Solution. Wells that are green in color indicate that the Stop Solution has not mixed thoroughly with the TMB Substrate.

VII. ASSAY PROCEDURE

Bring all reagents and samples to room temperature before use. It is recommended that all samples and standards be assayed in duplicate.

Note: *High concentrations of human IL-8 are found in human saliva. It is recommended that a face mask and gloves be used to protect kit reagents from contamination.*

1. Prepare all reagents and working standards as directed in the previous sections.
2. Remove excess microplate strips from the plate frame, return them to the foil pouch containing the desiccant pack, and reseal.
3. Add 100 µL of Assay Diluent RD1-85 to each well.
4. Add 50 µL of standard and prepared sample per well. Cover with the adhesive strip provided. **Incubate for 2 hours at room temperature.** A plate layout is provided for a record of standards and samples assayed.
5. Aspirate each well and wash, repeating the process three times for a total of four washes. Wash by filling each well with Wash Buffer (400 µL) using a squirt bottle, manifold dispenser, or autowasher. 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.
6. Add 100 µL of human IL-8 Conjugate to each well. Cover with a new adhesive strip. **Incubate for 1 hour at room temperature.**
7. Repeat the aspiration/wash as in step 5.
8. Add 200 µL of TMB Substrate to each well. **Incubate for 30 minutes at room temperature. Protect from light**.
9. Add 50 µL of Stop Solution to each well. Gently tap the plate to ensure thorough mixing.
10. Determine the optical density of each well within 10 minutes, using a microplate reader set to 450 nm. If wavelength correction is available, set to 540 nm or 570 nm. If wavelength correction is not available, subtract readings at 540 nm or 570 nm from the readings at 450 nm. This subtraction will correct for optical imperfections in the plate. Readings made directly at 450 nm without correction may be higher and less accurate.
11. **CALCULATION OF RESULTS**

    Average the duplicate readings for each standard and sample and subtract the average zero standard optical density (O.D.). 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. The data may be linearized by plotting the log of the human IL-8 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.

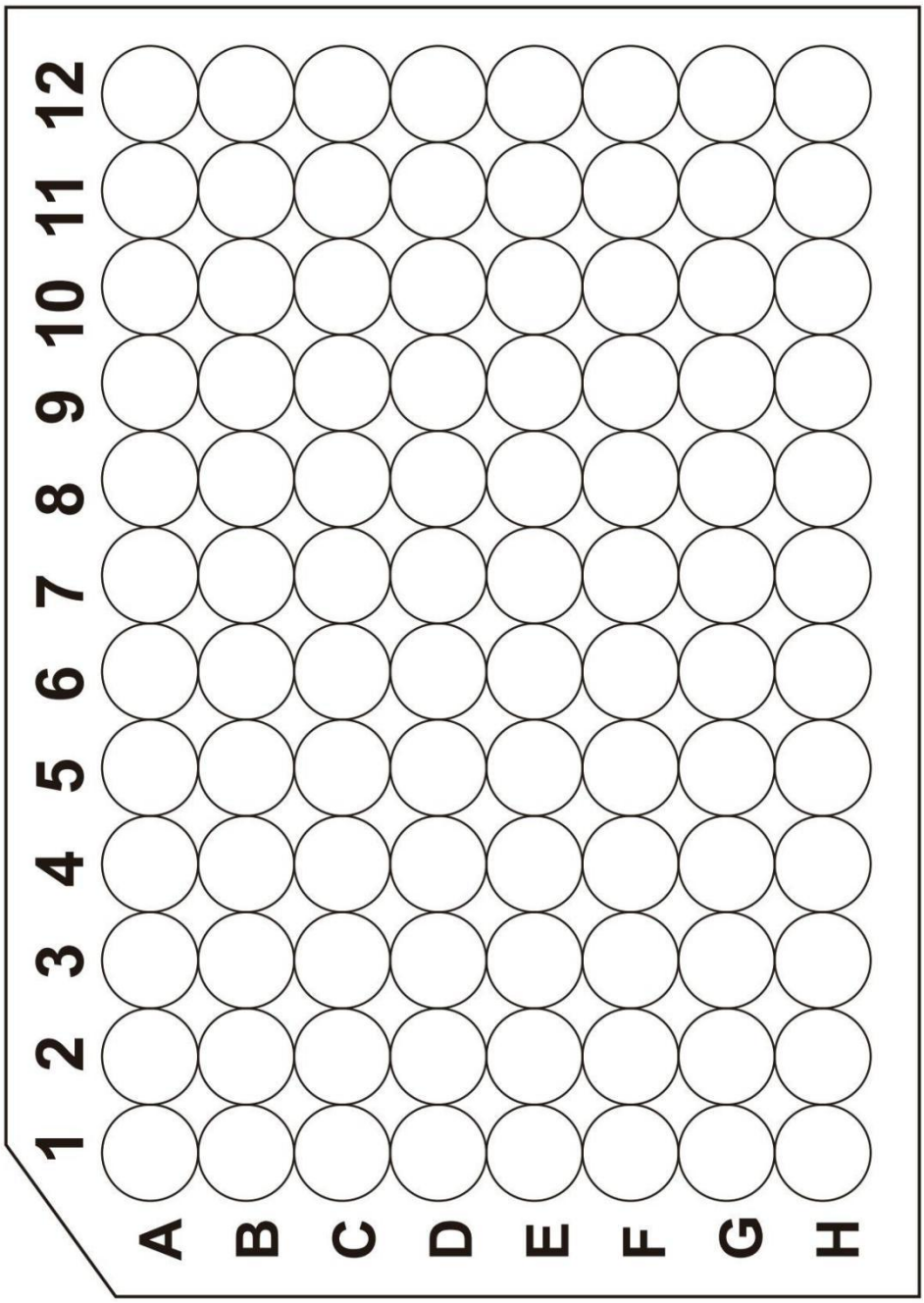
    If samples have been diluted, the concentration read from the standard curve must be multiplied by the dilution factor.

VIII. REFERENCES

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PLATE LAYOUT

Use this plate layout to record standards and samples assayed.



产品信息及操作手册

人 IL-8/CXCL8 Valukine™ ELISA 试剂盒

目录号：VAL103

适用于定量检测天然和重组人白介素 8（IL-8）/趋化因子 8（CXCL8）的浓度

科研专用，不可用于临床诊断

Bio-Techne China Co. Ltd

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版本号 202604.8

目录

I. 背景 21

II. 概述 23

III. 优势 24

IV. 实验 29

V. 试剂盒组成及储存 30

VI. 实验前准备 32

VII. 操作步骤 34

VIII. 参考文献 35

I. 背景

白细胞介素-8（IL-8，也称 GCP-1、NAP-1 和 CXCL8）是属于α型或 CXC 家族的 8-9 kDa 的趋化因子，可与肝素结合。目前为止，至少发现了 15 种人的 CXC 家族蛋白，大小在 8-12 kDa 之间。绝大多数位于人类 4 号染色体，都具有典型的三β折叠层/一个α螺旋结构，多数在 N 端显示 Glu-Leu-Arg 三肽基序（1-3）。人 IL-8 先合成为一个 99 个氨基酸前体，其中包含一个 20 个氨基酸的信号序列，和一个 79 个氨基酸的成熟区域（4-6）。它可作为单体、同源二聚体、及与 CXCL4/PF4 形成的异源二聚体在体内循环。IL-8 单体被认为是最具有生物活性的，而异源二聚体可能会增强 PF4 的活性（7-10）。在氨基酸水平，成熟的人 IL-8 与猪和犬分别有 65%和 70%的同源性（11, 12）。在啮齿动物中，IL-8 的相应基因尚未发现。通过选择性剪接和差别蛋白水解产生了多种 IL-8 亚型。选择性剪接发生在 C-端，那里有一个 11 个氨基酸替代（位置在 aa #92-99）（13）。蛋白酶水解作用可能是一个细胞的特定事件，它在 IL-8 的 N-端产生截断。例如，成纤维细胞和血管内皮细胞将第 21 和第 22 氨基酸切断，形成 IL-8（1-7），而单体细胞和淋巴细胞在第 21-25 氨基酸切割，产生 IL-8（6, 7）。这些短式 IL-8 一般来说具有更高的生物活性，尤其是针对 CXCR1 IL-8 受体的活性增高（6, 14）。大约 15%的 IL-8 在前体 Arg27 位发生了瓜氨酸化，这可提高 IL-8 的半衰期和促使白血球增多（15, 16）。很多类型的细胞都分泌 IL-8，其中包括单核细胞和中性粒细胞（17）、成纤维细胞和角质形成细胞（18）、肥大细胞（19）、内脏平滑肌细胞（20）、树突状细胞（21）、II 型大肺泡细胞（22）和内皮细胞（23）。

IL-8 受体有两个，都属于 G 蛋白耦联受体蛋白：CXCR1/IL-8 RA 和 CXCR2/IL-8 RB，二者之间的氨基酸序列享有 77%同源性（24）。CXCR1 分子量为 45-50kDa，几乎完全由 IL-8 独享；CXCR2 分子量为 35-40kDa，由所有的 CXC 趋化因子所共有（25, 26）。

CXCR1 和 CXCR2 分别形成组成型同源二聚体，这似乎是它们的功能性构型。当同一个细胞表达时，异源二聚体也会形成；但当它与 IL-8 结合后便会被解体（27）。CXCR2 对低浓度 IL-8 有响应，且主要与趋化和 MMP-9 释放有关。与此相反，CXCR1 对高浓度 IL-8 有响应，并与呼吸爆发及磷脂酶 D2 的激活有关（26）。因此，在中性粒细胞 CXCR2 被认为可引导中性粒细胞迁移到炎症部位，然后引发 CXCR1 介导的抗菌活性。

IL-8 最著名的功能是它在免疫细胞中的促炎作用。从本质上讲，IL-8 是由暴露于炎性刺激因子的多种细胞类型分泌。对于单核细胞/巨噬细胞来说，微生物的暴露引起 IL-8 的释放；随后，CXCR2 介导的趋化作用将中性粒细胞迁移到抗原攻击的部位，并伴随下一步抗菌

活性的激活及启动。IL-8 可增强骨髓 M-CSF 的作用，从而引起粒细胞的成熟和释放（14）。IL-8 的这两个功能相辅相成。有报道说，IL-8 对肿瘤相关的内皮细胞具有血管生成功能。此时，肿瘤源性的 IL-8 可以采取一种旁分泌方式激活血管内皮细胞的 CXCR1 和 CXCR2。CXCR1 和 CXCR2 都与 PI3-K/Akt 和 RasGTP 信号通路相关，参与细胞的存活和增殖。此外，IL-8 正调节 VEGFR2 和 EGFR 属于介导细胞生长和迁移的受体络氨酸激酶（28）。

II. 概述

A. 检测原理

本实验采用双抗体夹心ELISA法。抗人IL-8抗体包被于微孔板上，样品和标准品中的人IL-8会与固定在板上的抗体结合，游离的成分被洗去；加入辣根过氧化酶标记的抗人IL-8抗体；洗涤去除未结合的试剂后，加入TMB底物溶液（显色剂），溶液颜色与结合目标蛋白成正比；加入终止液；用酶标仪测定吸光度。

B. 检测局限

- **仅供科研使用，不可用于体外诊断；**
- 该试剂盒适用于细胞培养上清、人血清和人血浆样本；
- 请在试剂盒有效期内使用；
- 不同试剂盒及不同批号试剂盒的组分不能混用；
- 样本值若大于标准曲线的最高值，应将样本用标准品稀释液（1×）/ RD6Z稀释后重新检测；
- 检测结果的不同可由多种因素引起，包括实验人员的操作、移液器的使用方式、洗板技术、反应时间或温度、试剂盒的效期等。

III. 优势

A. 精确度

板内精确度（同一板内不同孔间的精确度）

已知浓度的三个样本，在同一板内分别检测20次，以确定板内精确度。

板间精确度（不同板之间的精确度）

已知浓度的三个样本，在不同板间分别检测20次，以确定板间精确度。

细胞上清

	板内精确度			板间精确度		
样本	1	2	3	1	2	3
平均值 (pg/mL)	115	386	802	132	410	817
标准差	5.3	17.0	37.9	10.7	28.0	42.4
CV%	4.6	4.4	4.7	8.1	6.8	5.2

血清/血浆

	板内精确度			板间精确度		
样本	1	2	3	1	2	3
平均值 (pg/mL)	168	526	1093	196	581	1160
标准差	9.4	28.6	70.7	14.5	56.6	70.2
CV%	5.6	5.4	6.5	7.4	9.7	6.1

B. 回收率

在不同样本中掺入检测范围内不同水平的人IL-8，测定其回收率。

样本类型	平均回收率（%）	范围（%）
细胞培养基 (n=5)	98	85 - 114
人血清 (n=5)	98	88 - 106
人EDTA血浆 (n=5)	103	97 - 111
人肝素血浆 (n=5)	102	92 - 107
人枸橼酸钠血浆 (n=5)	105	95 - 114

C. 灵敏度

对五十三次检测进行了评估，人IL-8的最低可检测剂量（MDD）范围为1.5-7.5 pg/mL。平均MDD为3.5 pg/mL。

MDD是根据20个重复的零标准品孔的吸光度值的平均值加两倍标准差计算得到的相对应浓度。

D. 校正

本免疫检测方法以R&D Systems生产的高度纯化的、由大肠杆菌表达的重组人IL-8（72个氨基酸单体）为标准进行校准。

NIBSC/WHO第1代国际标准品89/520已在本试剂盒中经过评估。该标准品的剂量反应曲线与Valukine标准曲线相平行。如需将使用Valukine人IL-8/CXCL8试剂盒获得的样本数值换算为近似的NIBSC国际单位，请使用以下公式：

NIBSC (89/520) 近似值 (IU/mL) = 0.001 × Valukine 人 IL-8 检测值 (pg/mL)

E. 线性

不同的样本中含有或掺入高浓度的人IL-8，然后用标准品稀释液（1×）/ RD6Z将样本稀释到检测范围内，测定其线性。

稀释倍数		细胞培养基 (n=4)	人血清 (n=4)	人EDTA血浆 (n=4)	人肝素血浆 (n=4)	人枸橼酸钠血浆 (n=4)
1:2	平均值/期待值（%）	96	95	93	93	93
	范围 (%)	93 - 99	93 - 98	89 - 97	89 - 97	87 - 96
1:4	平均值/期待值（%）	100	94	94	95	92
	范围 (%)	99 - 101	91 - 103	89 - 98	89 - 98	86 - 100
1:8	平均值/期待值（%）	104	94	94	94	91
	范围 (%)	93 - 110	90 - 110	89 - 105	89 - 106	83 - 104
1:16	平均值/期待值（%）	106	93	95	94	91
	范围 (%)	95 - 116	84 - 101	89 - 103	86 - 102	83 - 101

F. 样本预值

人血清/血浆 - 采用本检测方法对来自表观健康志愿者的三十四份样本进行了人IL-8检测。所有样本的检测结果均低于人IL-8的最低标准品浓度，即31.3 pg/mL。本研究未获得所用样本捐献者的既往病史信息。

细胞培养上清 - 将人外周血单核细胞（1 × 10^6个细胞/mL）培养于添加了10%胎牛血清、50 µM β-巯基乙醇、2 mM L-谷氨酰胺、100 U/mL青霉素和100 µg/mL硫酸链霉素的RPMI培养基中，并用10 µg/mL PHA进行刺激。分别在第1天和第5天取培养上清液的等分试样，检测其中人IL-8的水平。

条件	第1天 (pg/mL)	第5天 (pg/mL)
未刺激	27,000	33,000
刺激	73,000	102,000

G. 特异性

此ELISA法可检测天然及重组人IL-8蛋白。

将以下因子以50 ng/mL的浓度配制于标准品稀释液中，并进行交叉反应性检测。将以下因子以50 ng/mL的浓度掺入中浓度重组人IL-8质控品中，并进行干扰性检测。未观察到以下因子存在显著的交叉反应性或干扰。

Recombinant human		**Recombinant mouse**
ANG	IL-7	GM-CSF
AR	IL-9	IL-1α
CNTF	IL-10	IL-1β
β-ECGF	IL-11	IL-3
EGF	IL-12	IL-4
Epo	IL-13	IL-5
FGF acidic	IP-10	IL-5 Rα
FGF basic	KGF	IL-6
FGF-4	LAP (TGF-β1)	IL-7
FGF-5	LIF	IL-9
FGF-6	M-CSF	IL-10
G-CSF	MCP-1	IL-13
GM-CSF	MCP-2	KC
GROα	MCP-3	LIF
GROβ	MIP-1α	MIP-1α
GROγ	MIP-1β	MIP-1β
gp130	β-NGF	SCF
HB-EGF	OSM	TNF-α
HGF	PD-ECGF	**Recombinant amphibian**

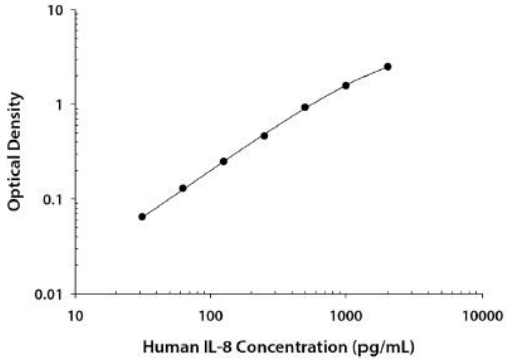
Recombinant human		**Recombinant mouse**
I-309	PDGF-AA	TGF-β5
IFN-γ	PDGF-AB	**Natural proteins**
IGF-I	PDGF-BB	bovine FGF acidic
IGF-II	PF-4	bovine FGF basic
IL-1α	PTN	human PDGF
IL-1β	RANTES	porcine PDGF
IL-1ra	SCF	human TGF-β1
IL-1 RI	SLPI	porcine TGF-β1
IL-1 RII	TGF-α	porcine TGF-β2
IL-2	TGF-β1	
IL-2 Rα	TGF-β3	
IL-3	TGF-β RII	
IL-3 Rα	TNF-α	
IL-4 R	TNF-β	
IL-5	TNF RI	
IL-5 Rβ	TNF RII	
IL-6	VEGF	
IL-6 R		

IV. 实验

标准曲线实例

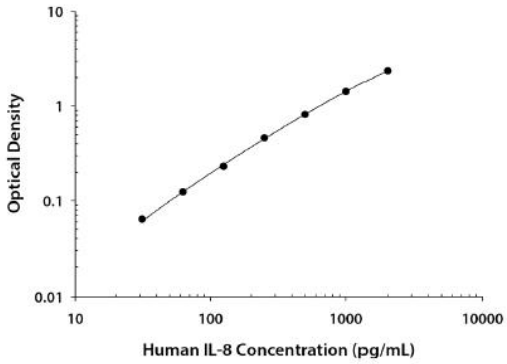
该标准曲线数据仅供参考，每次实验应绘制其对应的标准曲线。

CELL CULTURE SUPERNATE ASSAY



(pg/mL)	O.D.	Average	Corrected
0	0.099 0.101	0.100	—
31.3	0.164 0.166	0.165	0.065
62.5	0.227 0.232	0.230	0.130
125	0.347 0.350	0.349	0.249
250	0.559 0.570	0.564	0.464
500	1.025 1.036	1.030	0.930
1000	1.662 1.681	1.671	1.571
2000	2.588 2.606	2.597	2.497

SERUM/PLASMA ASSAY



(pg/mL)	O.D.	Average	Corrected
0	0.048 0.050	0.049	—
31.3	0.111 0.114	0.113	0.064
62.5	0.170 0.175	0.173	0.124
125	0.275 0.285	0.280	0.231
250	0.509 0.512	0.511	0.462
500	0.836 0.893	0.865	0.816
1000	1.451 1.503	1.477	1.428
2000	2.387 2.416	2.402	2.353

V. 试剂盒组成及储存

A. 试剂盒组成

组成	描述	规格
Human IL-8 Microplate	包被抗人IL-8抗体的96孔聚苯乙烯板，8孔×12条	1块板
Human IL-8 Conjugate	酶标抗人IL-8检测抗体	1瓶
Human IL-8 Standard	人IL-8标准品（冻干），参考瓶标签进行重溶	2瓶
Assay Diluent RD1-85	检测液RD1-85	1瓶
Calibrator Diluent (5×)/RD5P	浓缩的标准品稀释液（5×）用于稀释标准品和样本（*适用于细胞培养上清样本*）	1瓶
Calibrator Diluent RD6Z	标准品稀释液用于稀释标准品和样本（*适用于人血清/血浆样本*）	1瓶
Wash Buffer Concentrate（25×）	浓缩洗涤缓冲液（25×）	1瓶
TMB Substrate	TMB ELISA底物溶液/TMB底物溶液	2瓶
Stop Solution	终止液	1瓶
Plate Sealers	封板膜	3张

B. 试剂盒储存

<table>
<tr><td>未开封试剂盒</td><td colspan="2">2-8℃储存；请在试剂盒有效期内使用</td></tr>
<tr><td rowspan="8">已打开，稀释或重溶的试剂</td><td>洗涤液（1×）</td><td rowspan="6">2-8℃储存，最多30天*</td></tr>
<tr><td>终止液</td></tr>
<tr><td>酶标检测抗体</td></tr>
<tr><td>TMB底物溶液</td></tr>
<tr><td>检测液RD1-85</td></tr>
<tr><td>标准品稀释液RD6Z</td></tr>
<tr><td>标准品</td><td>每次检测使用新配制的标准品，使用后丢弃</td></tr>
<tr><td>标准品稀释液（5×）/RD5P</td><td>2-8℃储存，最多 30 天*
请每次使用新鲜配制的1×标准品稀释液，多余的丢弃</td></tr>
<tr><td>包被的微孔板条</td><td>将未用的板条放回带有干燥剂的铝箔袋内，密封；2-8℃储存，最多30天*</td></tr>
</table>

*必须在试剂盒有效期内

C. 实验所需自备试验器材

- 酶标仪（可测量450 nm检测波长的吸收值及540 nm或570 nm校正波长的吸收值）
- 高精度加液器及一次性吸头
- 蒸馏水或去离子水
- 洗瓶、多通道洗板器或自动洗板机
- 500 mL量筒

D. 注意事项

- IL-8在唾液中可被检测到。在运行本检测时，请采取预防措施以防止试剂盒组分受到污染。
- 本试剂盒提供的终止液为酸性溶液。
- 本试剂盒中的某些组分含有防腐剂，可能引起过敏性皮肤反应。避免吸入雾状液滴。
- 穿戴防护手套、防护服、眼罩和面罩。操作后彻底清洗双手。

VI. 实验前准备

A. 样品收集及储存

以下列出的样本采集和保存条件仅供一般性参考。样本稳定性尚未经过评估。

细胞培养上清液：颗粒物应离心去除；立刻检测样本。样本收集后若不及时检测，需按一次使用量分装，冻存于≤-20℃冰箱内，避免反复冻融。样本可能需要用标准品稀释液（1×）稀释。

血清样本：用血清分离管(SST)分离血清。使血样室温凝集30分钟，然后1000 × g离心15分钟。吸取血清样本之后即刻用于检测，或者分装，≤-20℃贮存备用。避免反复冻融。样本可能需要用标准品稀释液RD6Z稀释。

血浆样本：使用EDTA、肝素钠或枸橼酸钠作为抗凝剂收集血浆。然后1000 × g离心15分钟，需在30分钟内收集血浆样本之后即刻用于检测，或者分装，≤-20℃贮存备用。避免反复冻融。样本可能需要用标准品稀释液RD6Z稀释。

B. 样本准备工作

细胞培养上清液样本在检测前可能需要高达100倍的稀释。推荐的100倍稀释方法为：10 µL样本 + 990 µL标准品稀释液（1×）。最佳稀释度应由最终用户确定。

C. 检测前准备工作

使用前请将所有试剂放置于室温

注：*人唾液中含有高浓度的人IL-8，为避免污染，实验时请带口罩、手套。*

洗涤液（1×）：从冰箱中取出的浓缩洗涤液可能有结晶，属于正常现象；放置室温，轻摇混匀， 待结晶完全溶解后再配制洗涤液。可将20 mL浓缩洗涤液用蒸馏水或去离子水稀释配制成500 mL工作浓度的洗涤液（1×）。

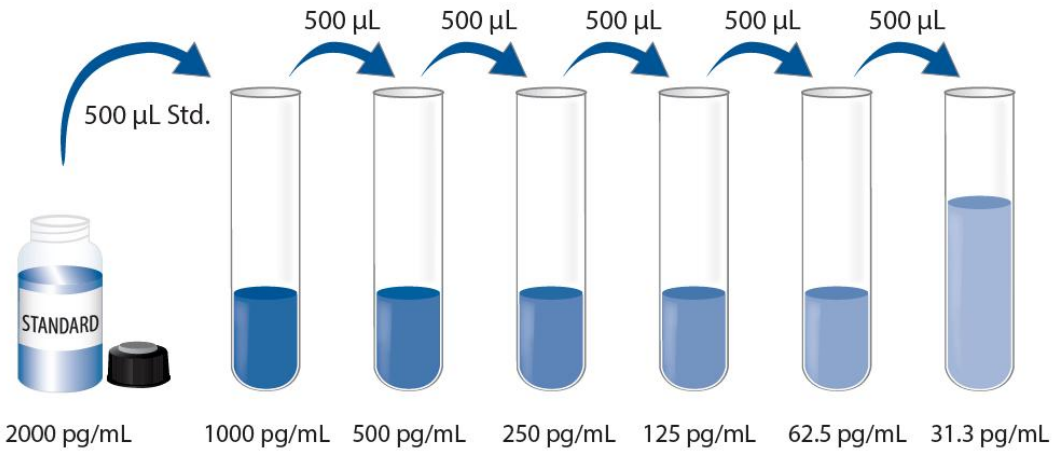
标准品稀释液（1×）：使用去离子水或蒸馏水稀释配制成标准品稀释液（1×）。将20 mL标准品稀释液 (5×)/RD5P加入到80 mL去离子水或蒸馏水中，以制备100 mL的标准品稀释液 (1×)。

人IL-8标准品：重溶体积请参考瓶身标签重溶冻干标准品*。使用标准品稀释液（1×）（*适用于细胞培养上清样本*）或标准品稀释液RD6Z（*适用于人血清/血浆样本*）复溶人IL-8标准品。复溶后得到浓度为2000 pg/mL的标准品储备液。在进行稀释前，让标准品静置至少15分钟，并伴随温和的摇动。

*如有疑问，请咨询我们的技术支持。

向每个稀释管中加入500 µL的标准品稀释液（1×）（*适用于细胞培养上清样本*）或标准品稀释液RD6Z（*适用于人血清/血浆样本*）。使用储备液按下图进行系列稀释。在每次转移

前，将每个稀释管充分混匀。未稀释的人IL-8标准品（2000 pg/mL）作为最高浓度标准点。相应的标准品稀释液作为零标准点（0 pg/mL）。



D. 技术小提示

- 当混合或重溶蛋白液时，尽量避免起沫；
- 为了避免交叉污染，配制不同浓度标准品、上样、加不同试剂都需要更换枪头。另外不同试剂请分别使用不同的移液槽；
- 每次孵育时，正确使用封板膜可保证结果的准确性；
- TMB底物溶液在上板前应为无色，请避光保存；加入微孔板后，将由无色变成不同深度的蓝色；
- 终止液上板顺序应同TMB底物溶液上板顺序一致；加入终止液后，孔内颜色由蓝变黄；若孔内有绿色，则表明孔内液体未混匀请充分混合。

VII. 操作步骤

使用前请将所有试剂和样本放置于室温，建议所有的实验样本和标准品做复孔检测。

注：*人唾液中含有高浓度的人IL-8。为防止试剂污染，建议佩戴口罩及手套。*

1. 按照上一节的说明，准备好所有需要的试剂和标准品；
2. 从已平衡至室温的密封袋中取出微孔板，未用的板条请放回铝箔袋内，重新封口；
3. 向每个孔中加入100 µL的检测液RD1-85；
4. 分别将不同浓度标准品和实验样本加入相应孔中，每孔50 µL。用封板膜封住反应孔，**室温孵育2小时**。说明书提供了一张96孔模板图，可用于记录标准品和试验样本的板内位置；
5. 将板内液体吸去，使用洗瓶、多通道洗板器或自动洗板机洗板。每孔加洗涤液400 µL，然后将板内洗涤液吸去。重复操作3次，共洗4次。每次洗板尽量吸去残留液体会有助于得到好的实验结果。最后一次洗板结束，请将板内所有液体吸干或将板倒置，在吸水纸拍干所有残留液体；
6. 在每个微孔内加入100 µL人IL-8酶标检测抗体。用封板膜封住反应孔，**室温孵育1小时**；
7. 重复第5步洗板操作；
8. 在每个微孔内加入200 µLTMB底物溶液，**室温孵育30分钟。注意避光**；
9. 在每个微孔内加入50 µL终止液，请轻拍微孔板，使溶液混合均匀；
10. 加入终止液后10分钟内，使用酶标仪测量450 nm的吸光度值，设定540 nm或570 nm作为校正波长。如果波长校正不可用，以450 nm的读数减去540 nm或570 nm的读数。这种减法将校正酶标板上的光学缺陷。没有校正而直接在450 nm处进行的读数可能会更高且更不准确；
11. **计算结果：**将每个标准品和样品的复孔吸光值取平均值，然后减去零标准品平均OD值（O.D.），使用计算机软件作四参数逻辑（4-PL）曲线拟合创建标准曲线。另一替代方法是，通过绘制y轴上每个标准品的平均吸光值与x轴上的浓度来构建标准曲线，并通过图上的点绘制最佳拟合曲线。数据可以通过绘制人IL-8浓度的对数与O.D.的对数来线性化，并且最佳拟合线可以通过回归分析来确定。该程序将产生足够但不太精确的数据拟合。

    如果样品被稀释，从标准曲线读取的浓度必须乘以稀释倍数。

VIII. 参考文献

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96 孔模板图

请使用 96 孔模板图来记录标准品及样本在板内的位置

