

## Speedy™ Human TSLP One-Step ELISA Kit Datasheet

Please read it entirely before use

**Catalogue Number:** SE50182

**Size:** 96T

**Sensitivity:** 0.7 pg/mL

**Range:** 7.8-500 pg/mL

**Usage:** For the quantitative detection of human TSLP concentrations in serum, plasma and cell culture supernatant.

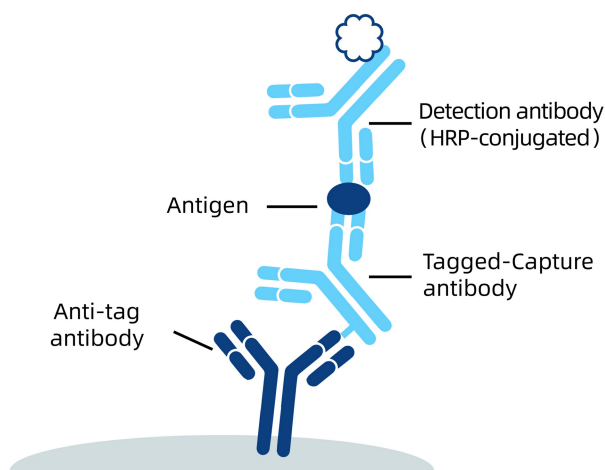
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## 1. Background

Thymic stromal lymphopoietin (TSLP) is a multifunctional cytokine primarily produced by epithelial cells in response to tissue damage, infection, or allergen exposure. It plays a significant role in immune regulation, inflammation, and cancer. TSLP acts through its receptor complex, composed of TSLP receptor (TSLPR) and interleukin-7 receptor alpha chain (IL-7R $\alpha$ ), to activate downstream signaling pathways, including JAK-STAT, PI3K-AKT, and MAPK. TSLP is involved in various physiological and pathological conditions, including asthma, allergic diseases, and chronic inflammatory diseases. It promotes type 2 immune responses by inducing the release of T cell-attracting chemokines from monocytes and enhancing the maturation of CD11c(+) dendritic cells. Additionally, TSLP plays a role in tissue homeostasis, host defense, and microbiome regulation.

## 2. Principle



An anti-tag antibody is pre-coated onto the bottom of wells. After adding antigen or samples, Tagged-Capture antibody and HRP-conjugated detection antibody, a sandwich complex is formed in the solution. TMB acts as a HRP substrate, and the solution color will change from colorless to blue. A stop solution containing sulfuric acid turns the solution yellow. The color intensity is proportional to the quantity of bound protein, which is measurable at 450 nm with the correction wavelength set at 630 nm.

## 3. Required Materials

- 3.1 A microplate reader capable of measuring absorbance at 450 nm with the correction wavelength set at 630 nm.
- 3.2 Calibrated, adjustable precision pipettes and disposable plastic tips. A manifold multi-channel pipette is recommended for large assays.
- 3.3 Plate washer: automated or manual.
- 3.4 Absorbent paper towels.
- 3.5 Glass or plastic tubes to prepare standard and sample dilutions.
- 3.6 Beakers and graduated cylinders.
- 3.7 Log-log or semi-log graph paper or computer and software for ELISA data analysis. A four-parameter logistic (4-PL) curve-fit is recommended. Proteintech data analysis website, <https://www.ptgcn.com/products/elisa-kits/>.
- 3.8 Microplate thermostatic shaker.

## 4. Kit Components and Storage

<b>Microplate</b> - 96 well microplate precoated an anti-tag antibody (8 well × 12 strips)	1 plate	<b>Unopened Kit:</b> Store at 2-8°C for 6 months or -20°C for 12 months. <b>Opened Kit:</b> All reagents stored at 2-8°C for 7 days. <b>Please use a new standard for each assay.</b>
<b>Protein standard</b> - 1000 pg/bottle; lyophilized	2 bottles	
<b>Capture antibody (100×)</b> - 60 µL/vial*	1 vial	
<b>Detection antibody, HRP-conjugated (100×)</b> - 60 µL/vial*	1 vial	
<b>Sample Diluent PT 1-bc</b> - 30 mL/bottle. For human serum and plasma samples.	1 bottle	
<b>Sample Diluent PT 4B1</b> - 30 mL/bottle. For cell culture supernatant samples.	1 bottle	
<b>Detection Diluent</b> - 15 mL/bottle	1 bottle	
<b>Wash Buffer Concentrate (20×)</b> - 30 mL/bottle	1 bottle	
<b>Tetramethylbenzidine Substrate (TMB)</b> - 12 mL/bottle	1 bottle	
<b>Stop Solution</b> - 12 mL/bottle	1 bottle	
<b>Plate Cover Seals</b>	4 pieces	

\* Centrifugation immediately before use

## 5. Safety Notes

- 5.1 Avoid any skin and eye contact with Stop Solution and TMB. In case of contact, wash thoroughly with water.
- 5.2 Do not use the kit after the expiration date.
- 5.3 Do not mix or substitute reagents or materials from other kit lots or other sources.
- 5.4 Be sure to wear protective equipment such as gloves, masks and goggles during the experiment.
- 5.5 When using an automated plate washer, adding a 30 second soak period following the addition of Wash Buffer to improve assay precision

## 6. Sample Collection and Storage

- 6.1 Serum: Allow blood samples to clot for 30 minutes, followed by centrifugation for 15 minutes at 1000×g. Clear serum can be assayed immediately or aliquoted and stored at -20°C. Avoid repeated freeze-thaw cycles.
- 6.2 Plasma: Use EDTA, heparin, or citrate as an anticoagulant for plasma collection. Centrifuge for 15 minutes at 1000×g within 30 minutes of collection. The plasma can be assayed immediately or aliquoted and stored at -20°C. Avoid repeated freeze-thaw cycles.
- 6.3 Cell Culture Supernatant: Remove particulates by centrifugation for 5 minutes at 500×g and assay immediately or aliquot and store samples at ≤ -20°C. Avoid repeated freeze-thaw cycles.

## 7. Regent Preparation

**7.1 Wash Buffer (1X):** If crystals have formed in the concentrate, warm to room temperature and mix gently until the crystals have completely dissolved. Add 30 mL of Wash Buffer Concentrate(20X) to 570 mL deionized or distilled water to prepare 1X Wash Buffer.

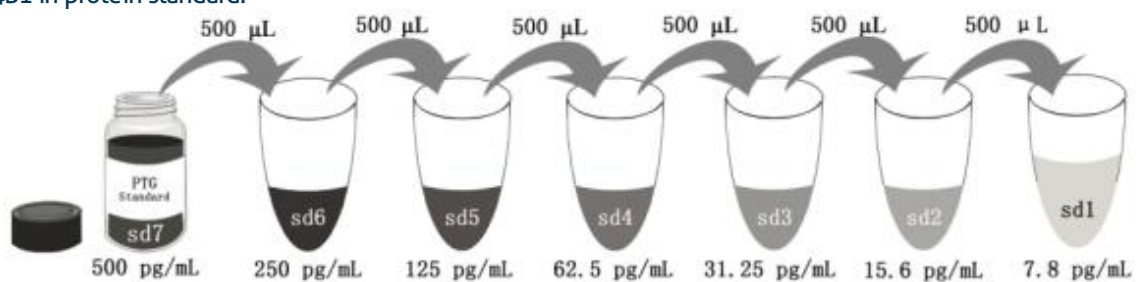
**7.2 Antibody Cocktail (1X):** Dilute 100X capture antibody and 100X HRP-conjugated detection antibody using Detection Diluent prior to assay. Suggested 1:100 dilution: 50 µL 100X capture antibody + 50 µL 100X Detection Antibody, HRP-conjugated + 4,900 µL Detection Diluent. Mix gently but thoroughly.

**7.3 Sample Dilution:** Different samples should be diluted with corresponding Sample Diluent, samples may require further dilution if the readout values are higher than the highest standard OD reading. Variations in sample collection, processing and storage may affect the results of the measurement.

Recommended Dilution for different sample types: 1:2 is recommended for human serum, plasma and cell culture supernatant.

### 7.4 Standard Serial Dilution:

For human serum and plasma, add 2 mL Sample Diluent PT 1-bc in protein standard. For cell culture supernatant, add 2 mL Sample Diluent PT 4B1 in protein standard.



Add # µL of Standard diluted in the previous step	—	500 µL	500 µL	500 µL	500 µL	500 µL	500 µL
# µL of Sample Diluent PT 1-bc or PT 4B1	2000 µL	500 µL	500 µL	500 µL	500 µL	500 µL	500 µL
	"sd7"	"sd6"	"sd5"	"sd4"	"sd3"	"sd2"	"sd1"

## 8. Assay Procedure Summary

Bring all reagents to room temperature before use (Detection antibody, HRP-conjugated antibody can be used immediately). 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.

8.1 Preset the layout of the microplate, including control group, standard group and sample group, take out the required number of microplate strips and return excess strips to the foil pouch containing the drying reagent pack and reseal; store at 4°C immediately. Microplate strips should be used in one week.

8.2 Add 50 µL standard or sample to appropriate wells. To avoid high background always add samples or standards to the well before the addition of antibody cocktail.

8.3 Add 50 µL 1× Antibody Cocktail solution (refer to Reagent Preparation 7.2) to each well. Seal plate with cover seal and incubate at 37°C on a microplate thermostatic shaker set at 400 rpm for 1 hour (incubate at 37°C for 2 hours is recommended if thermostatic shaker is not available) .

### 8.4 Wash

1) Gently remove the cover seal. Discard the liquid from wells by aspirating or decanting. Remove any residual solution by tapping the plate a few times on fresh paper towels.

2) Wash 4 times with 1× Wash Buffer, using at least 350-400 µL per well. Following the last wash, firmly tap plates on fresh towels 10 times to remove residual Wash Buffer. Avoid getting any towel fibers in the wells or wells drying out completely.

8.5 Add 100 µL TMB substrate solution to each well, protected from light. Incubate at 37°C on a microplate thermostatic shaker set at 400 rpm for 15 to 20 minutes. (Substrate Solution should remain colorless until added to the plate.)

8.6 Add 100 µL Stop Solution to each well in the same order as addition of the TMB substrate. Note: Avoid skin and eye contact with the Stop solution.

8.7 Read results immediately on a microplate reader at a wavelength of 450 nm. If possible, perform a double wavelength readout (450 nm and 630 nm).

8.8 Data analysis: Calculate the average of the duplicate readings (OD value) for each standard and sample, and subtract the average of the zero standard absorbance. Construct a standard curve by plotting the mean absorbance for each standard on the y-axis against the concentration on the x-axis, four-parameter logistic curve-fit (4-PL) analysis is recommended. If the samples have been diluted, the fitting result must be multiplied by the dilution factor used.

## Procedure summary

Add 50  $\mu$ L standard or sample to appropriate wells



Add 50  $\mu$ L antibody cocktail solution (1x) to each well



Incubate at 37  $^{\circ}$ C on a microplate thermostatic shaker set at 400 rpm for 1 hour



Aspirate and wash each well four times with 400 $\mu$ L 1 x Wash Buffer



Add 100  $\mu$ L TMB substrate solution to each well



Incubate at 37  $^{\circ}$ C on a microplate thermostatic shaker set at 400 rpm for 15minutes

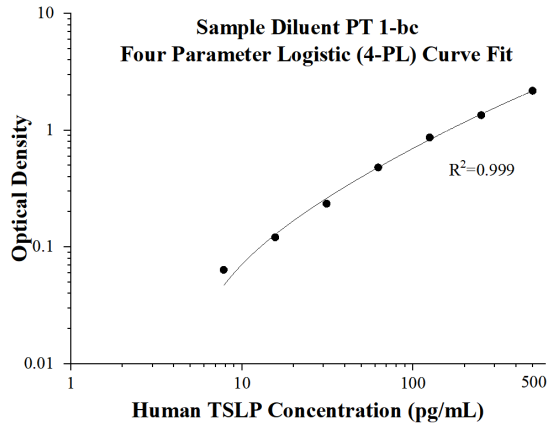


Add 100  $\mu$ L Stop Solution to each well and Read OD immediately

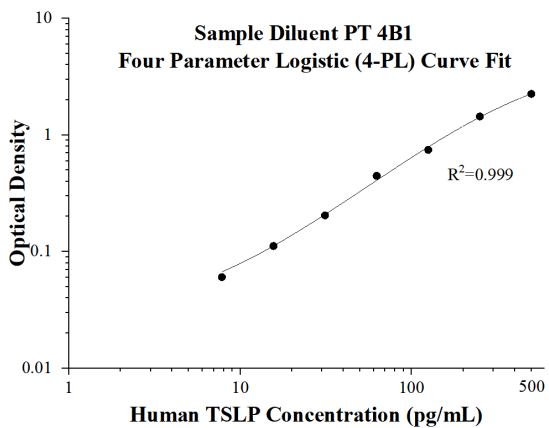
## 9. Validation Data

### 9.1 Standard curve

These standard curves are provided for demonstration only. A standard curve should be generated for each set of samples assayed.



(pg/mL)	O.D	Average	Corrected
0	0.0166 0.0152	0.0159	-
7.8	0.0801 0.0791	0.0796	0.0637
15.6	0.1381 0.136	0.13705	0.12115
31.25	0.2543 0.2471	0.2507	0.2348
62.5	0.4639 0.5287	0.4963	0.4804
125	0.8814 0.8881	0.88475	0.86885
250	1.3524 1.3766	1.3645	1.3486
500	2.278 2.1111	2.19455	2.17865



(pg/mL)	O.D	Average	Corrected
0	0.0109 0.0124	0.01165	-
7.8	0.0707 0.0734	0.07205	0.0604
15.6	0.1199 0.1264	0.12315	0.1115
31.25	0.2217 0.2108	0.21625	0.2046
62.5	0.4691 0.4452	0.45715	0.4455
125	0.7551 0.761	0.75805	0.7464
250	1.4839 1.4246	1.45425	1.4426
500	2.2553 2.2762	2.26575	2.2541

## 9.2 Precision

**Intra-assay Precision** (Precision within an assay) Three samples of known concentration were tested 8 times on one plate to assess intra-assay precision.

**Inter-assay Precision** (Precision between assays) Three samples of known concentration were tested in 16 separate assays to assess inter-assay precision.

Intra-assay Precision					Inter-assay Precision				
Sample	n	Mean (pg/mL)	SD	CV%	Sample	n	Mean (pg/mL)	SD	CV%
1	8	290.8	13.3	4.6	1	16	285.5	16.6	5.8
2	8	66.2	3.5	5.3	2	16	65.6	4.1	6.3
3	8	32.6	0.9	2.8	3	16	32.4	1.1	3.4

## 9.3 Recovery

The recovery of human TSLP spiked to three different levels throughout the range of the assay in various matrices was evaluated.

Sample Type		Average% of Expected	Range (%)
Human plasma	1:2	80	73-90
Cell culture supernatant	1:2	99	94-102

## 9.4 Sample values

**Human plasma** - Fifteen samples were evaluated for detectable levels of human TSLP in this assay. All samples measured less than the lowest standard, 7.8 pg/mL. No medical histories were available for the donors used in this study.

**Cell culture supernatant** - Human peripheral blood mononuclear cells (PBMC) ( $1 \times 10^6$  cells/mL) were cultured in DMEM supplemented with 10% fetal bovine serum, 5  $\mu$ M  $\beta$ -mercaptoethanol, 2 mM L-glutamine, 100 U/mL penicillin, and 100  $\mu$ g/mL streptomycin sulfate. Cells were cultured unstimulated or stimulated with 10  $\mu$ g/mL PHA for 3 days. Aliquots of the cell culture supernates were removed and assayed for levels of human TSLP. All samples measured less than the lowest standard, 7.8 pg/mL.

## 9.5 Sensitivity

The minimum detectable dose of human TSLP is 0.7 pg/mL. This was determined by adding two standard deviations to the concentration corresponding to the mean O.D. of 20 zero standard replicates.

## 9.6 Linearity

To assess the linearity of the assay, human plasma and cell culture supernatant samples were spiked with high concentrations of human TSLP and diluted with the appropriate **Sample Diluent** to produce samples with values within the dynamic range of the assay.

		Human plasma (Sample Diluent PT 1-bc)	Cell culture supernatant (Sample Diluent PT 4B1)
1:2	Average% of Expected	76	98
	Range (%)	75-78	93-103
1:4	Average% of Expected	105	96
	Range (%)	100-110	93-100
1:8	Average% of Expected	105	95
	Range (%)	103-107	92-98
1:16	Average% of Expected	116	90
	Range (%)	116-117	89-90

## 9.7 Specificity

This assay recognizes natural and recombinant human TSLP.

The following factors prepared at 50 ng/mL were assayed and exhibited no cross-reactivity or interference.

Recombinant human:

Ang2

BDNF

EPO

IFN- $\gamma$

IL-1 $\alpha$

Recombinant mouse:

IFN- $\gamma$

IL-1 $\alpha$

SCF

## 10. References

1. Rochman, Yrina et al. Science signaling vol. 16,802 (2023): eadg6360.
2. Lu, Hui et al. Journal of translational medicine vol. 20,1 414. 8 Sep. 2022.
3. Canè, Luisa et al. European journal of internal medicine vol. 124 (2024): 89-98.
4. Nakajima, Saeko et al. Allergology international : official journal of the Japanese Society of Allergology vol. 69,2 (2020): 197-203.