Mouse VEGF Sandwich ELISA Kit Datasheet

Please read it entirely before use

Catalogue Number: KE10220

Size: 96T

Sensitivity: 4.9 pg/mL

Range: 15.6-1000 pg/mL

Usage: For the quantitative detection of mouse VEGF concentrations in serum, plasma, cell culture supernatant, tissue lysate and tissue homogenate.

This product is for research use only and not for use in human or animal therapeutic or diagnostic.

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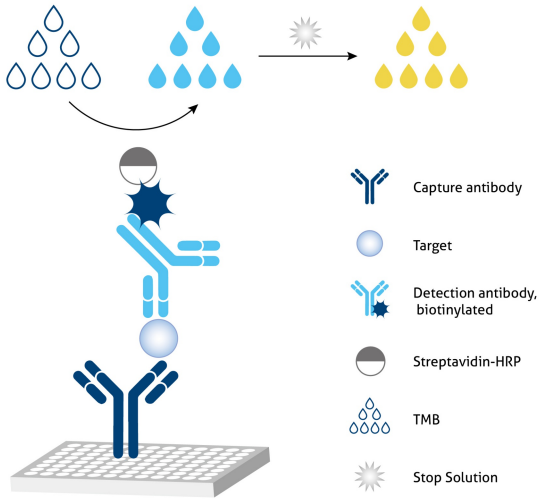
1. Background

Vascular endothelial growth factor (VEGF), is a signal protein produced by cells that stimulates vasculogenesis and angiogenesis. It is part of the system that restores the oxygen supply to tissues when blood circulation is inadequate such as in hypoxic conditions. Serum concentration of VEGF is high in bronchial asthma and diabetes mellitus. The activities of VEGF are not limited to the vascular system; VEGF plays a role in normal physiological functions such as bone formation, hematopoiesis, wound healing, and development. Disruption of this gene in mice resulted in abnormal embryonic blood vessel formation. VEGF is upregulated in many known tumors and its expression is correlated with tumor stage and progression.

2. Principle



Sandwich ELISA structure (Detection antibody labeled with biotin)

A capture antibody is pre-coated onto the bottom of wells which binds to analyte of interest. A detection antibody labeled with biotin also binds to the analyte. Streptavidin-HRP binds to the biotin. TMB acts as the HRP substrate and the solution color will change from colorless to blue. A stop solution containing sulfuric acid turns 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.

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4. Kit Components and Storage

Microplate - antibody coated 96-well microplate (8 well × 12 strips)	1 plate	**Unopened Kit:** Store at 2-8°C for 6 months or -20°C for 12 months. **Opened Kit:** All reagents stored at 2-8°C for 7 days. **Please use a new standard for each assay.**
Protein standard - 2000 pg/bottle; lyophilized	2 bottles	
Detection Antibody (100×), biotinylated - 120 µL/vial*	1 vial	
Streptavidin-horseradish peroxidase (HRP) (100×) - 120 µL/vial*	1 vial	
Sample Diluent PT 5 - 30 mL/bottle. For mouse serum and plasma	1 bottle	
Sample Diluent PT 4B1 - 30 mL/bottle. For cell culture supernatant and tissue homogenate.	1 bottle	
Sample Diluent PT 3-ef - 30 mL/bottle. For tissue lysate.	1 bottle	
Detection Diluent - 30 mL/bottle	1 bottle	
Wash Buffer Concentrate (20×) - 30 mL/bottle	1 bottle	
Extraction Reagent - 30 mL/bottle	1 bottle	
Tetramethylbenzidine Substrate (TMB) - 12 mL/bottle	1 bottle	
Stop Solution - 12 mL/bottle	1 bottle	
Plate Cover Seals	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

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6. Sample Collection and Storage

6.1 Serum: Allow blood samples to clot for 30 minutes, followed by centrifugation for 15 minutes at 1000xg. 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 1000xg 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 500xg and assay immediately or aliquot and store samples at ≤ -20°C. Avoid repeated freeze-thaw cycles.

6.4 Tissue Lysate:

1) Rinse tissue with PBS, cut into 1-2 mm pieces.

2) Add protease inhibitor cocktail to the Extraction Reagent to a final concentration immediately prior to performing tissue lysis.

3) Add 1 mL of Extraction Reagent containing protease inhibitor cocktail per 100 mg tissue.

4) Homogenize the tissue completely using desired method on ice, Incubate on ice for 30 minutes, use ultrasound to break up the cells.

5) Centrifuge tissue homogenates at 10,000 x g for 5 minutes at 4°C. Collect the supernatant, assay immediately or aliquot and store at -20°C.

6) Measure the concentration of total protein in tissue homogenates using BCA assay.

7) Avoid protein degradation by performing all the above procedures on ice where possible.

6.5 Tissue Homogenates: The preparation of tissue homogenates will vary depending upon tissue type. Rinse tissue with 1 x PBS to remove excess blood, Then add 1 mL of 1 x PBS per 100 mg tissue, homogenized and stored overnight at -20°C. After two freeze-thaw cycles were performed to break the cell membranes, the homogenates were centrifuged for 5 minutes at 10000 x g at 4°C. Collect the supernatant, assay immediately or aliquot and store at -20°C. Avoid repeated freeze-thaw cycles.

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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 Detection Antibody(1X): Dilute 100X Detection Antibody 1:100 using Detection Diluent prior to assay. Suggested 1:100 dilution: 10 µL 100X Detection Antibody + 990 µL Detection Diluent (Centrifuge the 100 X Detection Antibody solution for a few seconds prior to use).

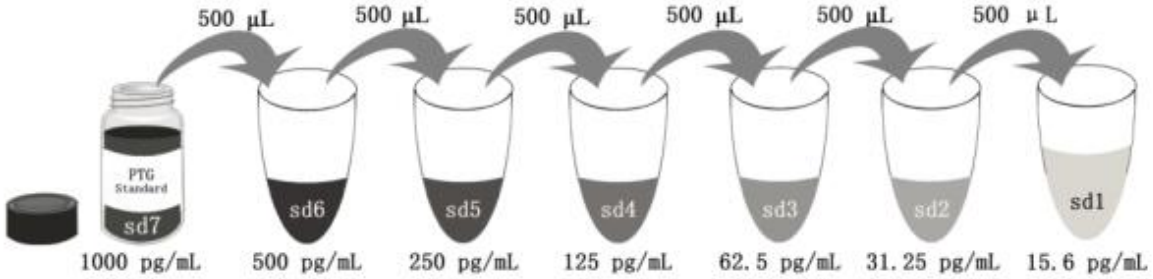
7.3 Streptavidin-HRP(1X): Dilute 100X Streptavidin-HRP 1:100 using Detection Diluent prior to assay. Suggested 1:100 dilution: 10 µL 100X Streptavidin-HRP + 990 µL Detection Diluent (Centrifuge the 100X Streptavidin-HRP solution for a few seconds prior to use).

7.4 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 or 1:4 is recommended for mouse serum and plasma; 1:2 to 1:8 is recommended for cell culture supernatant; 1:4 or 1:8 is recommended for tissue lysate; 1:10 or 1:20 is recommended for tissue homogenate.

7.5 Standard Serial Dilution:

For mouse serum and plasma, add 2 mL Sample Diluent PT 5 in protein standard. For cell culture supernatant and tissue homogenate, add 2 mL Sample Diluent PT 4B1 in protein standard. For tissue lysate, add 2 mL Sample Diluent PT 3-ef 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 5 or PT 4B1 or PT 3-ef	**2000 µL**	500 µL	500 µL	500 µL	500 µL	500 µL	500 µL
	"sd7"	"sd6"	"sd5"	"sd4"	"sd3"	"sd2"	"sd1"

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8. Assay Procedure Summary

Bring all reagents to room temperature before use (Detection antibody and Streptavidin-HRP 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 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 Preset the layout of the microplate, including control group,standard group and sample group, add 100 µL of each standard and sample to the appropriate wells.(Make sure sample addition is uninterrupted and completed within 5 to 10 minutes, It is recommended to assay all standards, controls, and samples in duplicate).

8.3 Seal plate with cover seal, pressing it firmly onto top of microwells. Incubate the plate for 2 hours at 37°C.

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 1X 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 of 1X Detection Antibody solution (refer to Reagent Preparation7.2) to each well. Seal plate with cover seal and incubate for 1 hour at 37°C.

8.6 Repeat wash step in 8.4.

8.7 Add 100 µL of 1X Streptavidin-HRP solution (refer to Reagent Preparation7.3) to each well. Seal plate with cover seal and incubate the plate for 40 minutes at 37°C .

8.8 Repeat wash step in 8.4.

8.9 Signal development: Add 100 µL of TMB substrate solution to each well, protected from light. Incubate for 15 to 20 minutes. Substrate Solution should remain colorless until added to the plate.

8.10 Quenching color development: Add 100 µL of Stop Solution to each well in the same order as addition of the TMB substrate. Mix by tapping the side of the plate gently. NB: Avoid skin and eye contact with the Stop solution.

8.11 Read results: Immediately after adding Stop solution read the absorbance on a microplate reader at a wavelength of 450 nm. If possible, perform a double wavelength readout (450 nm and 630 nm).

8.12 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, use four-parameter logistic curve- fit (4-PL) analysis to do this. If the samples have been diluted, the OD readout from the standard curve must be multiplied by the dilution factor used.

Step	Reagent	Volume	Incubation	Wash	Notes
1	Standard and Samples	100 µL	120 min	4 times	Cover Wells incubate at 37°C
2	Diluent Antibody Solution	100 µL	60 min	4 times	Cover Wells incubate at 37°C
3	Diluent HRP Solution	100 µL	40 min	4 times	Cover Wells incubate at 37°C
4	TMB Substrate	100 µL	15-20 min	Do not wash	Incubate in the dark at 37°C
5	Stop Solution	100 µL	0 min	Do not wash	-
6	Read plate at 450 nm and 630 nm immediately after adding Stop solution. DO NOT exceed 5 minutes.				

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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.

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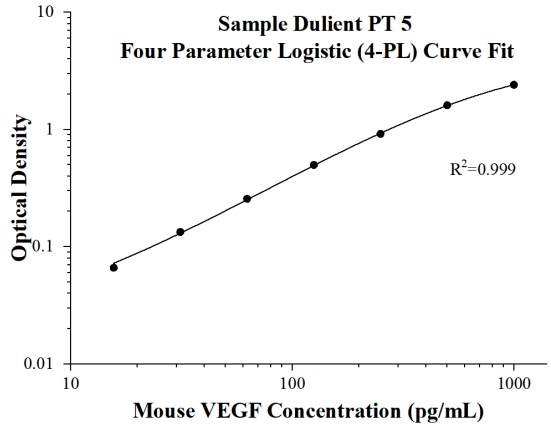
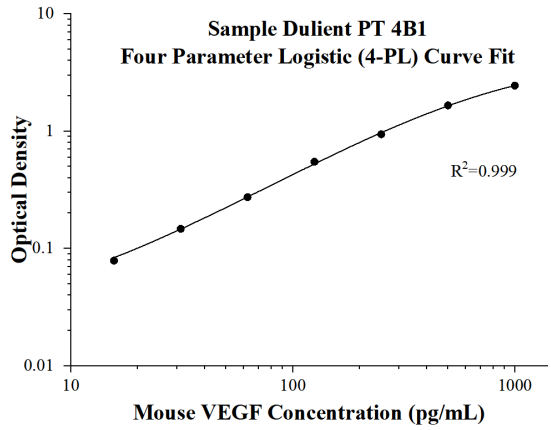
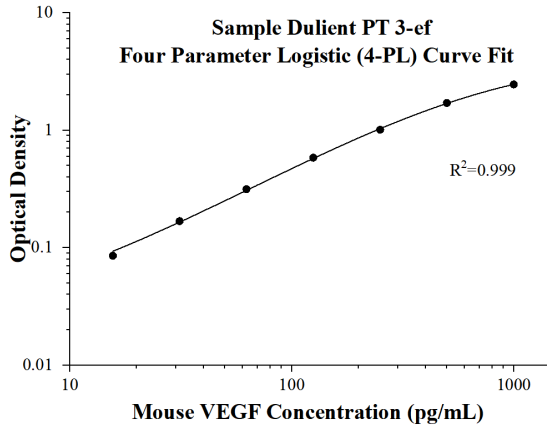


(pg/mL)	O.D	Average	Corrected
0	0.091 0.1008	0.0959	-
15.6	0.156 0.1683	0.16215	0.06625
31.25	0.2265 0.2329	0.2297	0.1338
62.5	0.3488 0.3552	0.352	0.2561
125	0.5903 0.599	0.59465	0.49875
250	1.0187 1.0091	1.0139	0.918
500	1.6916 1.7188	1.7052	1.6093
1000	2.4921 2.5151	2.5036	2.4077



(pg/mL)	O.D	Average	Corrected
0	0.088 0.0867	0.08735	-
15.6	0.1623 0.17	0.16615	0.0788
31.25	0.2362 0.2326	0.2344	0.14705
62.5	0.3682 0.3544	0.3613	0.27395
125	0.6513 0.6211	0.6362	0.54885
250	1.0327 1.0243	1.0285	0.94115
500	1.7607 1.7349	1.7478	1.66045
1000	2.5639 2.5093	2.5366	2.44925



(pg/mL)	O.D	Average	Corrected
0	0.0876 0.0874	0.0875	-
15.6	0.1738 0.1721	0.17295	0.08545
31.25	0.2586 0.2535	0.25605	0.16855
62.5	0.4054 0.3995	0.40245	0.31495
125	0.6679 0.6749	0.6714	0.5839
250	1.0879 1.1078	1.09785	1.01035
500	1.8151 1.7746	1.79485	1.70735
1000	2.5669 2.5249	2.5459	2.4584

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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				
Sample	n	Mean (pg/mL)	SD	CV%
1	8	520.7	22.0	4.2
2	8	140.3	9.0	6.4
3	8	67.9	3.7	5.4

Inter-assay Precision				
Sample	n	Mean (pg/mL)	SD	CV%
1	16	547.4	44.8	8.2
2	16	141.6	8.3	5.9
3	16	72.0	5.2	7.2

9.3 Recovery

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

Sample Type		Average% of Expected	Range (%)
Mouse serum	1:2	77	72-82
Cell culture supernatant	1:32	93	92-94
Tissue lysate	1:32	97	91-104
Tissue homogenate	1:64	94	93-96

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9.4 Sample values

Mouse serum - Sixteen serum samples from mice were evaluated for mouse VEGF in this assay. All samples measured less than the lowest standard, 15.6 pg/mL. No medical histories were available for the mice used in this study.

Cell culture supernatant - RAW 264.7 murine macrophage cells (3 x 10^6 cells/mL) were cultured in RPMI with 10% fetal bovine serum, 50 µM β-mercaptoethanol, 2 mM L-glutamine, 100 U/mL penicillin, and 100 µg/mL streptomycin sulfate. The cell culture supernatants were assayed for mouse VEGF and measured 22.1 pg/mL.
Mouse lung (1 lung, 1-2 mm pieces) were cultured in RPMI1640 plus 15% fetal bovine serum. An aliquot of cell culture supernatants was removed, assayed for mouse VEGF and measured 467.0 pg/mL.

Tissue lysate

	Mouse VEGF (pg/mL)	Total protein (**mg/mL**)
Mouse lung tissue lysate	2,169.8	5.9

Tissue homogenate

	Mouse VEGF (pg/mL)	Total protein (**mg/mL**)
Mouse heart tissue homogenate	1,984.0	1.4
Mouse lung tissue homogenate	1,017.6	1.8

9.5 Sensitivity

The minimum detectable dose of mouse VEGF is 4.9 pg/mL. This was determined by adding two standard deviations to the concentration corresponding to the mean O.D. of 20 zero standard replicates.

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9.6 Linearity

To assess the linearity of the assay, mouse serum samples were spiked with high concentmouseions of mouse VEGF and diluted with the appropriate **Sample Diluent** to produce samples with values within the dynamic range of the assay. Cell culture supernatant, tissue lysate and tissue homogenate samples were diluted with the appropriate **Sample Diluent** to produce samples with values within the dynamic range of the assay.

(The cell culture supernatant and tissue lysate was initially diluted 1:2. The tissue homogenate was initially diluted 1:5.)

		Mouse serum (Sample Diluent PT 5)	Cell culture supernatant (Sample Diluent PT 4B1)	Tissue lysate (Sample Diluent 3-ef)	Tissue homogenate (Sample Diluent PT 4B1)
1:2	Average% of Expected	71	100	100	100
	Range (%)	71-72	-	-	-
1:4	Average% of Expected	87	106	91	94
	Range (%)	86-88	101-112	90-92	92-96
1:8	Average% of Expected	103	114	98	95
	Range (%)	101-105	109-119	97-99	90-99
1:16	Average% of Expected	113	117	114	105
	Range (%)	106-120	115-119	113-115	97-113

9.7 Specificity

This assay recognizes natural and recombinant mouse VEGF.

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

Recombinant human:

PlGF

Recombinant mouse:

G-CSF

GM-CSF

IL-7

IL-1β

IL-4

KC

JE/MCP-1

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10. References

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