



# PDGF-AB (Human) ELISA Kit

Catalog Number KA0408

96 assays

Version: 07

Intended for research use only

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## **Introduction**

### **Intended Use**

For quantitative detection of human PDGF-AB in culture supernates, serum and plasma (heparin, EDTA).

### **Background**

The platelet-derived growth factor (PDGF) is a mitogen derived from human platelets consisting of two related polypeptides termed A and B chains.<sup>1</sup> The genes for PDGF A chain, B chain/c-sis, and the PDGF receptor are expressed in human malignant glioma cell lines.<sup>2</sup> Normal human endothelial cells in culture express the B chain of PDGF, and that endothelial-derived PDGF B chain is synthesized as a predicted precursor polypeptide of Mr 27,281.<sup>3</sup> The entire B chain of PDGF is highly (96%) homologous to a portion of p28sis, the transforming protein of simian sarcoma virus (SSV). It has been suggested that p28sis exerts its transforming potential by mimicking the growth promoting activity of PDGF and stimulating the cell in an autocrine manner.<sup>1</sup> PDGF A-chain precursor polypeptide is assigned to the proximal long arm of chromosome 7, band q11.23.<sup>4</sup> The human homolog (PDGF B-chain/c-sis) of the transforming gene of simian sarcoma virus is assigned to chromosome 22.<sup>5</sup> The standard product used in this kit is recombinant human PDGF-AB with the molecular mass of 27KDa.

### **Principle of the Assay**

PDGF-AB (Human) ELISA Kit was based on standard sandwich enzyme-linked immune-sorbent assay technology. A monoclonal antibody from mouse specific for PDGF-AB has been precoated onto 96-well plates. Standards (E. coli, (S87-T211)+(S82-T190) and test samples are added to the wells, a biotinylated detection polyclonal antibody from goat specific for PDGF-AB is added subsequently and then followed by washing with PBS or TBS buffer. Avidin-Biotin-Peroxidase Complex was added and unbound conjugates were washed away with PBS or TBS buffer. HRP substrate TMB was used to visualize HRP enzymatic reaction. TMB was catalyzed by HRP to produce a blue color product that changed into yellow after adding acidic stop solution. The density of yellow is proportional to the human PDGF-AB amount of sample captured in plate.

## General Information

### Materials Supplied

List of component

Component	Amount
96-well plate precoated with anti- human PDGF-AB antibody	96 wells
Lyophilized recombinant human PDGF-AB standard	10 ng x 2
Biotinylated anti- human PDGF-AB antibody, dilution 1:100	130 $\mu$ L
Avidin-Biotin-Peroxidase Complex (ABC), dilution 1:100	130 $\mu$ L
Sample diluent buffer	30 mL
Antibody diluent buffer	12 mL
ABC diluent buffer	12 mL
TMB color developing agent	10 mL
TMB stop solution	10 mL

### Storage Instruction

Store at 4°C for 6 months, at -20°C for 12 months. Avoid multiple freeze-thaw cycles.

### Materials Required but Not Supplied

- ✓ Microplate reader in standard size.
- ✓ Automated plate washer.
- ✓ Adjustable pipettes and pipette tips. Multichannel pipettes are recommended in the condition of large amount of samples in the detection.
- ✓ Clean tubes and Eppendorf tubes.
- ✓ Washing buffer (neutral PBS or TBS).
  - Preparation of 0.01 M TBS:  
Add 1.2 g Tris, 8.5 g NaCl; 450  $\mu$ L of purified acetic acid or 700  $\mu$ L of concentrated hydrochloric acid to 1000 mL H<sub>2</sub>O and adjust pH to 7.2-7.6. Finally, adjust the total volume to 1 L.
  - Preparation of 0.01 M PBS:  
Add 8.5 g sodium chloride, 1.4 g Na<sub>2</sub>HPO<sub>4</sub> and 0.2 g NaH<sub>2</sub>PO<sub>4</sub> to 1000 mL distilled water and adjust pH to 7.2-7.6. Finally, adjust the total volume to 1 L.

**Precautions for Use**

- ✓ To inspect the validity of experiment operation and the appropriateness of sample dilution proportion, pilot experiment using standards and a small number of samples is recommended.
- ✓ The TMB Color Developing agent is colorless and transparent before using, contact us freely if it is not the case.
- ✓ Before using the Kit, spin tubes and bring down all components to the bottom of tubes.
- ✓ Duplicate well assay is recommended for both standard and sample testing.
- ✓ Don't let 96-well plate dry, for dry plate will inactivate active components on plate.
- ✓ Don't reuse tips and tubes to avoid cross contamination.
- ✓ Avoid using the reagents from different batches together.
- ✓ In order to avoid marginal effect of plate incubation due to temperature difference (reaction may be stronger in the marginal wells), it is suggested that the diluted ABC and TMB solution will be pre-warmed in 37°C for 30 min before using.

## Assay Protocol

### Reagent Preparation

- ✓ Reconstitution of the human PDGF-AB standard: PDGF-AB standard solution should be prepared no more than 2 hours prior to the experiment. Two tubes of PDGF-AB standard (10 ng per tube) are included in each kit. Use one tube for each experiment.
  - 10,000 pg/mL of human PDGF-AB standard solution: Add 1 mL sample diluent buffer into one tube, keep the tube at room temperature for 10 min and mix thoroughly.
  - 2000 pg/mL of human PDGF-AB standard solution: Add 0.2 mL of the above 10 ng/mL PDGF-AB standard solution into 0.8 mL sample diluent buffer and mix thoroughly.
  - 1000 pg/mL→31.2 pg/mL of human PDGF-AB standard solutions: Label 6 Eppendorf tubes with 1000 pg/mL, 500 pg/mL, 250 pg/mL, 125 pg/mL, 62.5 pg/mL, 31.2 pg/mL, respectively. Aliquot 0.3 mL of the sample diluent buffer into each tube. Add 0.3 mL of the above 2000 pg/mL PDGF-AB standard solution into 1st tube and mix. Transfer 0.3 mL from 1st tube to 2nd tube and mix. Transfer 0.3 mL from 2nd tube to 3rd tube and mix, and so on.
  - Note: The standard solutions are best used within 2 hours. The 10 ng/mL standard solution may be stored at 4°C for up to 12 hours, or at -20°C for up to 48 hours. Avoid repeated freeze-thaw cycles.
  
- ✓ Preparation of biotinylated anti-human PDGF-AB antibody working solution: The solution should be prepared no more than 2 hours prior to the experiment.
  - The total volume should be: 0.1 mL/well x (the number of wells). (Allowing 0.1-0.2 mL more than total volume)
  - Biotinylated anti-human PDGF-AB antibody should be diluted in 1:100 with the antibody diluent buffer and mixed thoroughly. (i.e. Add 1 µL Biotinylated anti-human PDGF-AB antibody to 99 µL antibody diluent buffer.)
  
- ✓ Preparation of Avidin-Biotin-Peroxidase Complex (ABC) working solution: The solution should be prepared no more than 1 hour prior to the experiment.
  - The total volume should be: 0.1 mL/well x (the number of wells). (Allowing 0.1-0.2 mL more than total volume)
  - Avidin- Biotin-Peroxidase Complex (ABC) should be diluted in 1:100 with the ABC dilution buffer and mixed thoroughly. (i.e. Add 1 µL ABC to 99 µL ABC diluent buffer.)

### Sample Preparation

- ✓ Sample Preparation and Storage  
Store samples to be assayed within 24 hours at 2-8°C. For long-term storage, aliquot and freeze samples at -20°C. Avoid repeated freeze-thaw cycles.

- Cell culture supernate: Remove particulates by centrifugation, analyze immediately or aliquot and store at -20°C.
- Serum: Allow the serum to clot in a serum separator tube (about 4 hours) at room temperature. Centrifuge at approximately 1000 x g for 15 min. Analyze the serum immediately or aliquot and store frozen at -20°C.
- Plasma: Collect plasma using heparin or EDTA as an anticoagulant. Centrifuge for 15 min at 1000 x g within 30 min of collection. For eliminating platelet, suggesting that further centrifugation for 10 min at 2-8°C at 10000 x g. Analyze immediately or aliquot and store frozen at -20°C. Citrate is not recommended as the anticoagulant.

✓ **Sample Dilution Guideline**

The user needs to estimate the concentration of the target protein in the sample and select a proper dilution factor so that the diluted target protein concentration falls near the middle of the linear regime in the standard curve. Dilute the sample using the provided diluent buffer. The following is a guideline for sample dilution. Several trials may be necessary in practice. The sample must be well mixed with the diluents buffer.

- High target protein concentration (20-200 ng/mL). The working dilution is 1:100. i.e. Add 1 µL sample into 99 µL sample diluent buffer.
- Medium target protein concentration (2-20 ng/mL). The working dilution is 1:10. i.e. Add 10 µL sample into 90 µL sample diluent buffer.
- Low target protein concentration (31.2-2000 pg/mL). The working dilution is 1:2. i.e. Add 50 µL sample to 50 µL sample diluent buffer.
- Very Low target protein concentration ( $\leq 31.2$  pg/mL). No dilution necessary, or the working dilution is 1:2.
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**Assay Procedure**

The ABC working solution and TMB color developing agent must be kept warm at 37°C for 30 min before use. When diluting samples and reagents, they must be mixed completely and evenly. Standard PDGF-AB detection curve should be prepared for each experiment. The user will decide sample dilution fold by crude estimation of PDGF-AB amount in samples.

1. Aliquot 0.1 mL per well of the 2000 pg/mL, 1000 pg/mL, 500 pg/mL, 250 pg/mL, 125 pg/mL, 62.5 pg/mL, 31.2 pg/mL human PDGF-AB standard solutions into the precoated 96-well plate. Add 0.1 mL of the sample diluent buffer into the control well (Zero well). Add 0.1 mL of each properly diluted sample of human cell culture supernates, serum or plasma (heparin, EDTA) to each empty well. See "Sample Dilution Guideline" above for details. We recommend that each human PDGF-AB standard solution and each sample is measured in duplicate.
2. Seal the plate with the cover and incubate at 37°C for 90 min.

3. Remove the cover, discard plate content, and blot the plate onto paper towels or other absorbent material. Do NOT let the wells completely dry at any time.
  4. Add 0.1 mL of biotinylated anti-human PDGF-AB antibody working solution into each well and incubate the plate at 37°C for 60 min.
  5. Wash the plate three times with 0.01 M TBS or 0.01 M PBS, and each time let washing buffer stay in the wells for 1 min. Discard the washing buffer and blot the plate onto paper towels or other absorbent material. (Plate washing method: Discard the solution in the plate without touching the side walls. Blot the plate onto paper towels or other absorbent material. Soak each well with at least 0.3 mL PBS or TBS buffer for 1~2 minutes. Repeat this process two additional times for a total of THREE washes. *Note: for automated washing, aspirate all wells and wash THREE times with PBS or TBS buffer, overfilling wells with PBS or TBS buffer. Blot the plate onto paper towels or other absorbent material.*)
  6. Add 0.1 mL of prepared ABC working solution into each well and incubate the plate at 37°C for 30 min.
  7. Wash plate 5 times with 0.01 M TBS or 0.01 M PBS, and each time let washing buffer stay in the wells for 1-2 min. Discard the washing buffer and blot the plate onto paper towels or other absorbent material. (see step 5 for plate washing method)
  8. Add 90 µL of prepared TMB color developing agent into each well and incubate plate at 37°C in dark for 25-30 min (*Note: For reference only, the optimal incubation time should be determined by end user. And the shades of blue can be seen in the wells with the four most concentrated human PDGF-AB standard solutions; the other wells show no obvious color*).
  9. Add 0.1 mL of prepared TMB stop solution into each well. The color changes into yellow immediately.
  10. Read the O.D. absorbance at 450 nm in a microplate reader within 30 min after adding the stop solution.
- ✓ Summary
1. Add samples and standards and incubate the plate at 37°C for 90 min. Do not wash.
  2. Add biotinylated antibodies and incubate the plate at 37°C for 60 min. Wash plate 3 times with 0.01 M TBS.
  3. Add ABC working solution and incubate the plate at 37°C for 30 min. Wash plate 5 times with 0.01 M TBS.
  4. Add TMB color developing agent and incubate the plate at 37°C in dark for 25-30 min.
  5. Add TMB stop solution and read.



## Data Analysis

### Calculation of Results

For calculation, (the relative O.D.450) = (the O.D.450 of each well) – (the O.D.450 of Zero well). The standard curve can be plotted as the relative O.D.450 of each standard solution (Y) vs. the respective concentration of the standard solution (X). The human PDGF-AB concentration of the samples can be interpolated from the standard curve.

*Note: if the samples measured were diluted, multiply the dilution factor to the concentrations from interpolation to obtain the concentration before dilution.*

Typical Data Obtained from soluble Human PDGF-AB

Concentration (pg/mL)	0.0	31.2	62.5	125	250	500	1000	2000
O.D.	0.023	0.126	0.252	0.423	0.922	1.358	1.856	2.195

(TMB reaction incubate at 37°C for 25 min)

### Performance Characteristics

- ✓ Range  
31.2 pg/mL-2000 pg/mL
- ✓ Sensitivity  
< 2 pg/mL
- ✓ Specificity  
Natural and recombinant Human PDGF-AB
- ✓ Cross-reactivity  
No detectable cross-reactivity with other relevant proteins.
- ✓ Precision
  - Intra-Assay Precision (Precision within an assay) Three samples of known concentration were tested on one plate to assess intra-assay precision.
  - Inter-Assay Precision (Precision between assays) Three samples of known concentration were tested in separate assays to assess inter-assay precision.

	Intra-Assay Precision			Inter-Assay Precision		
Sample	1	2	3	1	2	3
n	16	16	16	24	24	24
Mean (pg/mL)	237	532	974	254	683	1205
Standard Deviation	11.6	27.7	62.4	13.97	45.8	95.2
CV(%)	4.9	5.2	6.3	5.5	6.7	7.9

## Resources

### References

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**Plate Layout**

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