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Datasheet/User Guide

Human TGF-beta 1 ELISA Kit

Catalog Number: E82-008

Lot Number: 250811

For Serum, Plasma, Cell Culture Supernatants

Introduction

Transforming Growth Factor Beta (TGF-beta) is a stable, multifunctional polypeptide growth factor. TGF-beta exists in at least five isoforms, known as TGF-beta1, TGF-beta2, TGF-beta3, TGF-beta4, TGF-beta5. Their amino acid sequences display homologies on the order of 70-80%. The various TGF-beta isotypes share many biological activities and their actions on cells are qualitatively similar in most cases although there are a few examples of distinct activities. TGF-beta1 is the prevalent form and is found almost ubiquitously while the other isoforms are expressed in a more limited spectrum of cells and tissues. It is normally secreted as an inactive, or latent, complex.

The Human TGF-beta 1 ELISA kit is an in-vitro enzyme-linked immunosorbent assay for the quantitative measurement of Human TGF-beta 1 in serum, plasma, and cell culture supernatants. This assay employs an antibody specific for Human TGF-beta 1 coated on a 96-well plate. Standards and samples are pipetted into the wells and TGF-beta 1 present in a sample is bound to the wells by the immobilized antibody. The wells are washed and biotinylated anti-Human TGF-beta 1 antibody is added. After washing away unbound biotinylated antibody, HRP-conjugated streptavidin is pipetted to the wells. The wells are again washed, a TMB substrate solution is added to the wells and color develops in proportion to the amount of TGF-beta 1 bound. The Stop Solution changes the color from blue to yellow, and the intensity of the color is measured at 450 nm.

Storage/Shelf Life

2 - 8°C/6 months from date of receipt

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Reagents

Component	Size / Description	Storage/Stability After Preparation
Human TGF-beta 1 Microplate	96 wells (12 x 8) coated with anti-Human TGF-beta 1	1 month at 4ºC
Human TGF-beta 1 Standard Protein	2 vials Human TGF-beta 1; 1 vial is enough to run each standard in duplicate	1 week at -80ºC
Human TGF-beta 1 Detection Antibody	2 vials biotinylated anti-TGF beta 1; Each vial is enough to assay half the microplate	5 days at 4ºC
Wash Buffer	25 ml 20X concentrated solution	1 month at 4ºC
HRP-Streptavidin	200 µL 500X concentrated HRP-conjugated Streptavidin	Do not store and reuse
TMB One-Step Substrate Reagent	12 ml 3,3,5,5'-tetramethylbenzidine (TMB) in buffer solution	n/a
Stop Solution	8 ml 0.2 M sulfuric acid	n/a
Assay Diluent A	30 ml of diluent buffer, 0.09% sodium azide as preservative	n/a
Assay Diluent B	15 ml 5X concentrated diluent	1 month at 4ºC

Additional Materials Required (but not provided)

- Microplate reader capable of measuring absorbance at 450 nm.
- ELISA plate shaker or platform rocker.
- Precision pipettes to deliver 2 µl to 1 ml volumes.
- Adjustable 1-25 ml pipettes for reagent preparation.
- 100 ml and 1 liter graduated cylinders.
- Absorbent paper.
- Distilled or deionized water.
- 12 N HCl
- 10 N NaOH
- HEPES
- Log-log graph paper or computer and software for ELISA data analysis.
- Tubes to prepare standard or sample dilutions.

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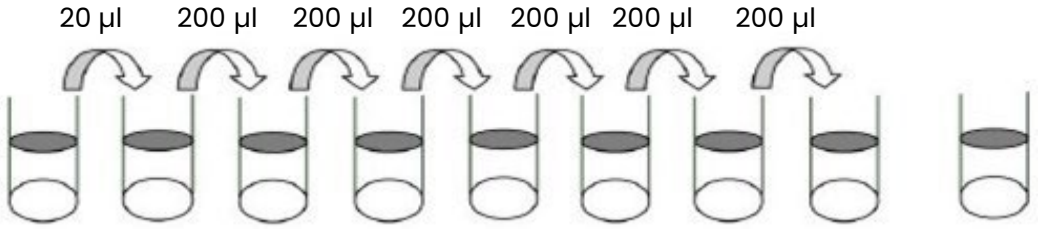
Reagent Preparation

1. Bring all reagents and samples to room temperature before use.
2. Assay Diluent B should be diluted 5-fold with deionized or distilled water before use.
3. Sample dilution: 1X Assay Diluent B should be used for dilution of serum, plasma, and cell culture supernatant samples. The suggested dilution for normal serum/plasma is 20-fold after treatment (*see activation steps on page 4.)

   Note: Levels of TGF-beta 1 may vary between different samples. Optimal dilution factors for each sample must be determined by the investigator.

4. Preparation of standard: Briefly spin a vial of standard protein. Add 400 µl 1X Assay Diluent B into the Standard Protein vial to prepare a 125 ng/ml standard. Dissolve the powder thoroughly by a gentle mix. Add 20 µl TGF-beta 1 standard from the vial of Standard Protein into a tube with 605 µl 1X Assay Diluent B to prepare a 4000 pg/ml stock standard solution. Pipette 300 µl 1X Assay Diluent B into each tube. Use the 4000 pg/ml stock standard solution to produce a dilution series (shown below). Mix each tube thoroughly before the next transfer. 1X Assay Diluent B serves as the zero standard (0 pg/ml).



Diluent volume	Std + 400 µl	605 µl	300 µl	300 µl	300 µl	300 µl	300 µl	300 µl	300 µl
Concentration	125 ng/ml	4000 pg/ml	1600 pg/ml	640 pg/ml	256 pg/ml	102.4 pg/ml	40.96 pg/ml	16.38 pg/ml	0 pg/ml

5. If the Wash Buffer (20X) contains visible crystals, warm to room temperature and mix gently until dissolved. Dilute 25 ml of 20X Wash Buffer into 475 ml deionized or distilled water to yield 500 ml of 1X Wash Buffer.

6. Briefly spin the Detection Antibody vial before use. Add 100 µl of 1X Assay Diluent B into the vial to prepare a detection antibody concentrate. Pipette up and down to mix gently (the concentrate can be stored at 4°C for 5 days). The detection antibody concentrate should be diluted 80-fold with 1X Assay Diluent B and used in step 5 of Assay Procedure.
7. Briefly spin the HRP-Streptavidin concentrate vial and pipette up and down to mix gently before use, as precipitates may form during storage. HRP-Streptavidin concentrate should be diluted 500-fold with 1X Assay Diluent B. For example: Add 20 µl of HRP-Streptavidin concentrate into a tube with 10 ml 1X Assay Diluent B to prepare a final 500-fold diluted solution. Mix well. DO NOT STORE THE DILUTED SOLUTION FOR NEXT DAY USE.

*Reagents to activate serum, plasma, and cell culture supernatant samples

1 N HCl (100 ml) – Slowly add 8.33 ml of 12 N HCl into 91.67 ml deionized water. Mix bottle.

1.2 N NaOH/0.5 M HEPES (100 ml) - Slowly add 12 ml of 10 N NaOH into 75 ml deionized water. Mix bottle. Add 11.9 g HEPES. Mix through. Bring final volume to 100 mL with deionized water.

TGF-beta 1 Sample Activation Procedure

To activate latent TGF-beta 1 to the immunoreactive form, follow the activation procedure outlined below. Assay samples after neutralization (pH 7.0 - 7.6). Use polypropylene test tubes.

Notes: Do not activate the kit standards. The kit standards contain active TGF-beta 1.

1. Cell Culture Supernatant

Add 0.1 ml 1 N HCl into 0.5 mL cell culture supernatant. Mix tube thoroughly. Incubate for 10 minutes at room temperature. Neutralize the acidified sample by adding 0.1 ml 1.2 N NaOH/0.5 M HEPES (PH=7.0~7.6). Mix tube thoroughly. Assay immediately. The activated sample may be diluted with 1X Assay Diluent B. The concentration read off the standard curve must be multiplied by the dilution factor.

2. Serum/plasma

Add 0.05 ml 1 N HCl to 0.1 ml serum. Mix tube thoroughly. Incubate for 10 minutes at room temperature. Neutralize the acidified sample by adding 0.05 ml 1.2 N NaOH/0.5 M HEPES (PH=7.0~7.6). Mix tube thoroughly. Assay immediately. The activated sample may be diluted with 1X Assay Diluent B. The concentration read off the standard curve must be multiplied by the dilution factor.

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Assay Procedure

1. Bring all reagents and samples to room temperature before use. It is recommended that all standards and samples be run at least in duplicate.
2. Label removable 8-well strips as appropriate for your experiment.
3. Add 100 µl of each standard (see Reagent Preparation step 4) and sample into appropriate wells. Cover wells and incubate for 2.5 hours at room temperature with gentle shaking.
4. Discard the solution and wash 4 times with 1X Wash Solution. Wash by filling each well with Wash Buffer (300 µl) using a multi-channel Pipette 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.
5. Add 100 µl of 1X prepared biotinylated antibody (Reagent Preparation step 6) to each well. Incubate for 1 hour at room temperature with gentle shaking.
6. Discard the solution. Repeat the wash as in step 4.
7. Add 100 µl of prepared Streptavidin solution (see Reagent Preparation step 7) to each well. Incubate for 45 minutes at room temperature with gentle shaking.
8. Discard the solution. Repeat the wash as in step 4.
9. Add 100 µl of TMB One-Step Substrate Reagent to each well. Incubate for 30 minutes at room temperature in the dark with gentle shaking.
10. Add 50 µl of Stop Solution to each well. Read at 450 nm immediately.

Assay Procedure Summary

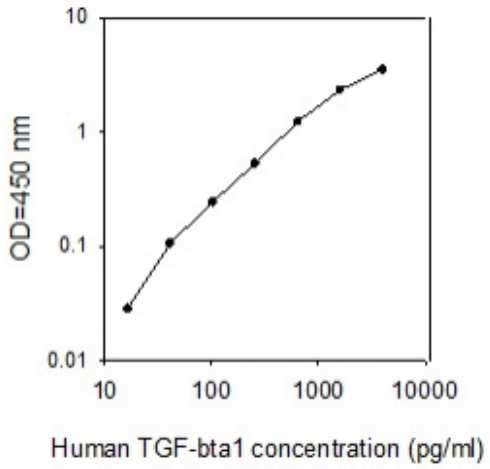
1. Prepare all reagents, samples and standards as instructed.
2. Add 100 µl standard or sample to each well. Incubate 2.5 hours at room temperature.
3. Add 100 µl prepared biotin antibody to each well. Incubate 1 hour at room temperature.
4. Add 100 µl prepared Streptavidin solution. Incubate 45 minutes at room temperature.
5. Add 100 µl TMB One-Step Substrate Reagent to each well. Incubate 30 minutes at room temperature.
6. Add 50 µl Stop Solution to each well. Read at 450 nm immediately.

Calculation of Results

Calculate the mean absorbance for each set of duplicate standards, controls and samples, and subtract the average zero standard optical density. Plot the standard curve on log-log graph paper or using Sigma plot software, with standard concentration on the x-axis and absorbance on the y-axis. Draw the best-fit straight line through the standard points.

Typical Data

The typical standard curve was generated using the Human TGF-beta 1 ELISA kit protocol. This standard curve is for demonstration only. A standard curve must be generated for each assay.



Sensitivity

The minimum detectable dose of Human TGF-beta 1 was determined to be 18 pg/ml.

Minimum detectable dose is defined as the analyte concentration resulting in an absorbance that is 2 standard deviations higher than that of the blank (diluent buffer.)

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Spiking & Recovery

Recovery was determined by spiking various levels of Human TGF-beta 1 into the sample types listed below. Mean recoveries are as follows:

Sample Type	Average % Recovery	Range (%)
Serum	95.8	83-103
Plasma	83.7	75-94
Cell culture media	121.7	113-127

Linearity

Sample Type	Serum	Plasma	Cell culture media
1:2 dilution Avg % of Expected Range (%)	 124.5 118-131	 121.2 116-125	 103.9 88-119
1:4 dilution Avg % of Expected Range (%)	 98.1 77-120	 133.5 129-141	 105.7 97-114

Reproducibility

Intra-Assay CV%: <10%

Inter-Assay CV%: <12%

Specificity

This ELISA kit shows no cross-reactivity with any of the cytokines tested: Human ANG, CD23, Eotaxin, GCSF, GMCSF, GRO-alpha, GRO-beta, GRO-gamma, I-309, IFN-gamma, IL-1 alpha, IL-1 beta, IL-3, IL-4, IL-5, IL-6, IL-7, IL-8, IL-10, IL-12 (p40), IL-12 (p70), IL-15, IL-16, IP-10, MCP-1, MCP-2, MCP-3, MCP-4, MCSF, MIG, MIP-1alpha, MIP1beta, NAP-2, PDGF, PF-4, PARC, SCF, SDF-1alpha, TIMP-1, TIMP-2, TNF-alpha, TGF-beta 2, TGF-beta 3, VEGF.

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Troubleshooting Guide

Problem	Potential Cause	Solution
Poor Standard Curve	◦Inaccurate pipetting ◦Improper standard dilution	◦Check pipettes ◦Briefly centrifuge the standard protein and dissolve the powder thoroughly by gently mixing
Low Signal	◦Improper preparation of standard and/or biotinylated antibody	◦Briefly spin down vials before opening
	◦Too brief incubation times	◦Ensure sufficient incubation times are followed. Standard/sample incubation step may be done overnight at 4ºC with gentle shaking (may increase overall signal, including background)
	◦Inadequate reagent volumes or improper dilution	◦Check pipettes and ensure correct preparation
Large CV	◦Inaccurate pipetting ◦Air bubbles in wells	◦Check pipettes ◦Carefully remove air bubbles
High Background	◦Plate is insufficiently washed	◦Review protocol for proper wash steps. If using a plate washer, ensure all ports are unobstructed.
	◦Contaminated wash buffer	◦Make fresh wash buffer
Low Sensitivity	◦Improper storage of the kit	◦Store the standard at -70ºC after reconstitution, others at 2-8 ºC. Keep substrate solution protected from light
	◦Stop Solution issue	◦Add stop solution to each well before reading plate

Warranty

Products are warranted by Bethyl Laboratories, Inc. to meet stated product specifications and to conform to label descriptions when used, handled and stored according to instructions. Unless otherwise stated, this warranty is limited to six months from date of receipt. Bethyl Laboratories sole liability for the product is limited to replacement of the product or refund of the purchase price. Bethyl Laboratories products are supplied for research applications. They are not intended for medicinal, diagnostic or therapeutic use. The products may not be resold, modified for resale or used to manufacture commercial products without prior written approval from Bethyl Laboratories, Inc. For more information, go to our website: https://www.fortislife.com/sales-terms