



# AssayMax Human Transforming Growth Factor-beta 1 (TGF-beta1) ELISA Kit

Catalog Number ET3102-1

## Introduction

Transforming growth factor-beta 1 (TGF-beta 1) is one of the transforming growth factor beta (TGFbeta) family of cytokines exert pleiotropic effects upon a wide variety of cell types. TGFbeta1 has been demonstrated to be of fundamental importance in the development, physiology and pathology of the vascular system (1). It is known to maintain a balance between apoptosis and cellular dysfunction (2). Overexpression of TGF-beta1 are the cellular changes associated with abnormal extracellular matrix deposition in nodular glomerulosclerosis (3), and may be a pathogenetic mechanism in tumor progression (4). High serum levels of TGF-beta1 probably mirror an anti-inflammatory response, which might play a role in controlling the systemic immune response (5).

## Principal of the Assay

The AssayMax Human TGF-beta1 ELISA kit is designed for detection of TGF-beta1 in cell culture supernatants. This assay employs a quantitative sandwich enzyme immunoassay technique that measures TGF-beta1 in 4.5 hours. A murine monoclonal antibody specific for human TGF-beta1 has been pre-coated onto a microplate. TGF-beta1 in standards and samples is sandwiched by the immobilized antibody and a biotinylated polyclonal antibody specific for human TGF-beta1, which is recognized by a streptavidin-peroxidase conjugate. All unbound material is then washed away and a peroxidase enzyme substrate is added. The color development is stopped and the intensity of the color is measured.

## Caution and Warning

- This kit is for research use only.
- The kit should not be used beyond the expiration date.
- The Stop Solution is an acid solution.

## Reagents

- **TGF-beta1 Microplate:** A 96 well polystyrene microplate (12 strips of 8 wells) coated with a murine monoclonal antibody against TGF-beta1.
- **Sealing Tapes:** Each kit contains 3 pre-cut, pressure-sensitive sealing tapes that can be cut to fit the format of the individual assay.

- **TGF-beta1 Standard:** Recombinant human TGF-beta1 in a buffered protein base (2 ng, lyophilized).
- **Biotinylated TGF-beta1 Antibody (80x):** A 80-fold biotinylated polyclonal antibody against TGF-beta1 (100 µl).
- **Streptavidin-Peroxidase Conjugate (SP Conjugate):** A 100-fold concentrate (120 µl).
- **EIA Diluent Concentrate (10x):** A 10-fold buffered protein base (20 ml).
- **Wash Buffer Concentrate (10x):** A 10-fold concentrated buffered surfactant (2 x 30 ml).
- **Chromogen Substrate:** A ready-to-use stabilized peroxidase chromogen substrate tetramethylbenzidine (8 ml).
- **Stop Solution:** A 0.5 N hydroxychloric acid (12 ml) to stop the chromogen substrate reaction.

## Storage Condition

- Store unopened kit at 2-8<sup>0</sup>C up to expiration date.
- Opened reagents may be stored for up to 1 month at 2-8<sup>0</sup>C. Store reconstituted mTGF-beta1 standard at -20<sup>0</sup>C or below.
- Opened unused strip wells may return to the foil pouch with the desiccant pack, reseal along with zip-seal. May be stored for up to 1 month in a vacuum desiccator.

## Other Supplies Required

- Microplate reader capable of measuring absorbance at 450 nm
- Pipettes (1-20 µl, 20-200 µl, and multiple channel)
- Deionized or distilled reagent grade water

## Sample Collection, Preparation and Storage

- **Cell Culture Supernatants:** Centrifuge cell culture media at 2000 x g for 10 minutes to remove debris. Collect supernatants and assay. Store samples at -20<sup>0</sup>C or below. Avoid repeated freeze-thaw cycles.

## Reagent Preparation

- Freshly dilute all reagents and bring all reagents to room temperature before use. If crystals have formed in the concentrate, mix gently until the crystals have completely dissolved.
- **EIA Diluent Concentrate (10x):** Dilute the EIA Diluent Concentrate 1:10 with reagent grade water.
- **Standard Curve:** Reconstitute the 2 ng of human TGF-beta1 Standard with 1 ml of EIA Diluent to generate a solution of 2 ng/ml. Allow the standard to sit for 10 minutes with gentle agitation prior to making dilutions. Prepare triplicate standard points by serially diluting the TGF-beta1 standard solution twofold with equal volume of EIA Diluent to produce 1, 0.5, 0.25, 0.125, 0.0625 and 0.031 ng/ml. EIA Diluent serves as the zero standard (0 ng/ml).

Standard Point	Dilution	[TGF-beta1] (ng/ml)
P1	Standard (2 ng/ml)	2.000
P2	1 part P1 + 1 part EIA Diluent	1.000
P3	1 part P2 + 1 part EIA Diluent	0.500
P4	1 part P3 + 1 part EIA Diluent	0.250
P5	1 part P4 + 1 part EIA Diluent	0.125
P6	1 part P5 + 1 part EIA Diluent	0.063
P7	1 part P6 + 1 part EIA Diluent	0.031
P8	EIA Diluent	0.000

- **Biotinylated TGF-beta1 Antibody (80x):** Spin down the antibody briefly and dilute the desired amount of the antibody 1:80 with EIA Diluent.
- **Wash Buffer Concentrate (10x):** Dilute the Wash Buffer Concentrate 1:10 with reagent grade water.
- **SP Conjugate (100x):** Spin down the SP Conjugate briefly and dilute the desired amount of the conjugate 1:100 with EIA Diluent.

## Assay Procedure

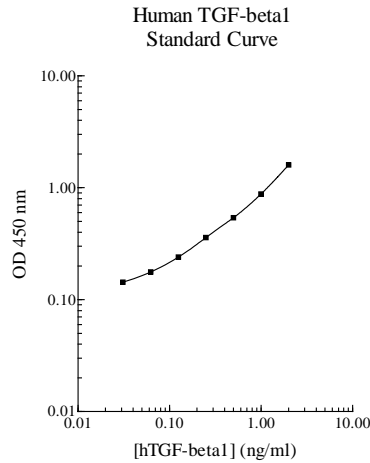
- Prepare all reagents, working standards and samples as instructed. Bring all reagents to room temperature before use. The assay is performed at room temperature (20-30°C).
- Remove excess microplate strips from the plate frame and return them immediately to the foil pouch with desiccant inside. Reseal the pouch securely to minimize exposure to water vapor and store in a vacuum desiccator.
- Add 50 µl of Standard or sample per well. Cover wells and incubate for two hours. Start the timer after the last sample addition.
- Wash five times with 200 µl of Wash Buffer. Invert the plate and decant the contents, and hit it 4-5 times on absorbent paper towel to completely remove liquid at each step.
- Add 50 µl of Biotinylated TGF-beta1 Antibody to each well and incubate for 2 hours.
- Wash five times with 200 µl of Wash Buffer as above.
- Add 50 µl of Streptavidin-Peroxidase Conjugate per well and incubate for 30 minutes. Turn on the microplate reader and set up the program in advance.
- Wash five times with 200 µl of Wash Buffer as above.
- Add 50 µl of Chromogen Substrate per well and incubate for approximately 20 minutes or till the optimal blue color density develops. Gently tap the plate to ensure thorough mixing and break the bubbles in the well with pipette tip.
- Add 50 µl of Stop Solution to each well. The color will change from blue to yellow.
- Read the absorbance on a microplate reader at a wavelength of 450 nm **immediately**.

## Data Analysis

- Calculate the mean value of the triplicate readings for each standard and sample.
- To generate a Standard Curve, plot the graph using the standard concentrations on the x-axis and the corresponding mean 450 nm absorbance on the y-axis. The best-fit line can be determined by regression analysis of the linear portion of the curve.
- Determine the unknown sample concentration from the Standard Curve and multiply the plasma or tissue value by the dilution factor of 2.

## Standard Curve

- The curve is provided for illustration only. A standard curve should be generated each time the assay is performed.



## Sensitivity and Specificity

- The minimum detectable dose of TGF-beta1 is typically < 30 pg/ml.
- Intra-assay and inter-assay coefficients of variation were 5.2% and 7.0% respectively.
- This assay recognizes both natural and recombinant human TGF-beta1.

## References

1. Ghosh J *et. al.* (2005) *Cardiovasc Pathol.* 14(1):28-36
2. Jacob T *et. al.* (2005) *J Vasc Surg.* 41(3):523-30
3. Zhao HL *et. al.* (2004) *Am J Kidney Dis.* 44(6):1039-49
4. Maluccio M *et. al.* (2003) *Transplantation.* 76(3):597-602
5. Widhe M *et. al.* (2002) *Immunology.* 107(1):46-55

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