# Recombinant Human TGF-β1

Catalog Number: 240-B

## DESCRIPTION

| | |
|---|---|
| **Source** | Chinese Hamster Ovary cell line, CHO-derived<br>Ala279-Ser390<br>Accession # P01137 |
| **N-terminal Sequence Analysis** | Ala279 |
| **Structure / Form** | Disulfide-linked homodimer |
| **Predicted Molecular Mass** | 12.8 kDa (monomer) |

## SPECIFICATIONS

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| **SDS-PAGE** | 12 kDa, reducing conditions<br>24 kDa, non-reducing conditions |
| **Activity** | Measured by its ability to inhibit the IL-4-dependent proliferation of HT-2 mouse T cells. Tsang, M. *et al.* (1995) Cytokine **7**:389.<br>The $ED_{50}$ for this effect is 0.04-0.2 ng/mL.<br>The specific activity of Recombinant Human TGF-β1 is approximately 2.5 x $10^4$ U/µg, which is calibrated against human TGF-β1 Standard (NIBSC code: 89/514). |
| **Endotoxin Level** | <0.10 EU per 1 µg of the protein by the LAL method. |
| **Purity** | >97%, by SDS-PAGE visualized with Silver Staining and quantitative densitometry by Coomassie® Blue Staining. |
| **Formulation** | Lyophilized from a 0.2 µm filtered solution in Acetonitrile and TFA with BSA as a carrier protein. See Certificate of Analysis for details. |

## PREPARATION AND STORAGE

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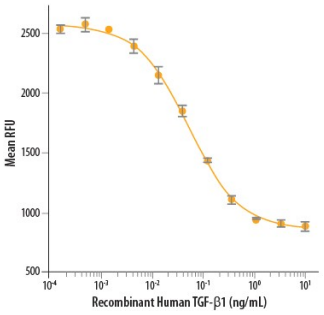
| **Reconstitution** | Purified recombinant human TGF-β1 is an extremely hydrophobic protein that adheres strongly to surfaces. To ensure recovery, reconstitute at 20 µg/mL in sterile 4 mM HCl containing 1 mg/mL human or bovine serum albumin. |
| **Shipping** | The product is shipped at ambient temperature. Upon receipt, store it immediately at the temperature recommended below. |
| **Stability & Storage** | **Use a manual defrost freezer and avoid repeated freeze-thaw cycles.**<br>● 12 months from date of receipt, -20 to -70 °C as supplied.<br>● 1 month, 2 to 8 °C under sterile conditions after reconstitution.<br>● 3 months, -20 to -70 °C under sterile conditions after reconstitution. |

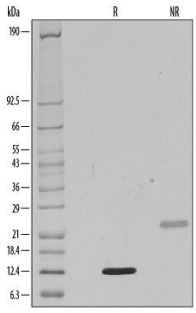
## DATA

### Bioactivity



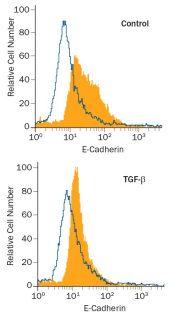

Recombinant Human TGF-beta 1 (Catalog # 240-B) inhibits Recombinant Mouse IL-4 (Catalog # 404-ML) induced proliferation in the HT-2 mouse T cell line. The $ED_{50}$ for this effect is 0.04-0.2 ng/mL.

### SDS-PAGE




1 µg/lane of Recombinant Human TGF-beta 1 was resolved with SDS-PAGE under reducing (R) and non-reducing (NR) conditions and visualized by silver staining, showing single bands at 12 kDa and 24 kDa, respectively.

### Bioactivity




Epithelial to Mesenchymal Transition (EMT) was induced in the A549 human lung carcinoma cell line with cell culture media supplemented with Recombinant Human (rh) TGF-beta 1 (Catalog # 240-B). Control cells were cultured without rhTGF-beta 1. EMT induction was confirmed at 48 h by flow cytometric staining for E-Cadherin (filled; Catalog # FAB18381P), an epithelial cell marker, or an isotype control (Catalog # IC0041P). TGF-beta 1 decreased the expression of E-Cadherin.



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## BACKGROUND

TGF-β1 (transforming growth factor beta 1) is one of three closely related mammalian members of the large TGF-β superfamily that share a characteristic cystine knot structure (1-7). TGF-β1, -2 and -3 are highly pleiotropic cytokines that are proposed to act as cellular switches that regulate processes such as immune function, proliferation and epithelial-mesenchymal transition (1-4). Each TGF-β isoform has some non-redundant functions; for TGF-β1, mice with targeted deletion show defects in hematopoiesis and endothelial differentiation, and die of overwhelming inflammation (2). Human TGF-β1 cDNA encodes a 390 amino acid (aa) precursor that contains a 29 aa signal peptide and a 361 aa proprotein (8). A furin-like convertase processes the proprotein to generate an N-terminal 249 aa latency-associated peptide (LAP) and a C-terminal 112 aa mature TGF-β1 (8, 9). Disulfide-linked homodimers of LAP and TGF-β1 remain non-covalently associated after secretion, forming the small latent TGF-β1 complex (8-10). Covalent linkage of LAP to one of three latent TGF-β binding proteins (LTBPs) creates a large latent complex that may interact with the extracellular matrix (9, 10). TGF-β is activated from latency by pathways that include actions of the protease plasmin, matrix metalloproteases, thrombospondin 1 and a subset of integrins (10). Mature human TGF-β1 shares 100% aa identity with pig, dog and cow TGF-β1, and 99% aa identity with mouse, rat and horse TGF-β1. It demonstrates cross-species activity (1). TGF-β1 signaling begins with high-affinity binding to a type II ser/thr kinase receptor termed TGF-β RII. This receptor then phosphorylates and activates a second ser/thr kinase receptor, TGF-β RI (also called activin receptor-like kinase (ALK) -5), or alternatively, ALK-1. This complex phosphorylates and activates Smad proteins that regulate transcription (3, 11, 12). Contributions of the accessory receptors betaglycan (also known as TGF-β RIII) and endoglin, or use of Smad-independent signaling pathways, allow for disparate actions observed in response to TGF-β in different contexts (11).

**References:**

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