Recombinant Human TGF-β1 Protein

Product Name

Recombinant Human TGF-β1 Protein

Size / Catalog Number

10μg / GMP-TL643-0010

50μg / GMP-TL643-0050

Product Information

Synonyms: CEDLAP, DPD1, TGFB1, TGF beta 1

Accession: UniProt P01137

Expressed Region: Ala279-Ser390

Tag: Tag free

Expression system: HEK293 cells

Molecular weight: 13.2 kDa (Reduced SDS-PAGE)

Purity: > 95% as determined by SDS-PAGE

Endotoxin: < 1 EU per 1 μg of protein (LAL method)

Activity: Measured in a cell proliferation assay using HT-2 cells, corresponding to a specific activity of ≥ 5×10^6 IU/mg.

Form: Lyophilized from sterile PBS (pH7.4), typically supplemented with 6% mannitol as a protectant.

Background

TGF-β1 is a pleiotropic regulatory polypeptide cytokine belonging to the TGF-β superfamily. Secreted as a latent precursor and proteolytically activated into a homodimeric structure, it engages the TGFBRII/ALK5 receptor complex to initiate SMAD2/3-SMAD4 signaling cascades, governing critical processes including cell proliferation, differentiation, migration, and extracellular matrix deposition. It exhibits dual-phase immunomodulatory functions: inducing FoxP3+ regulatory T-cell (Treg) differentiation to maintain immune tolerance while suppressing effector T-cell activation and NK cell cytotoxicity. In tissue repair, it drives fibroblast-to-myofibroblast transition and collagen synthesis. For cell therapy applications, this protein serves as a key culture modulator-low-dose sustained exposure preserves stemness in CAR-T cells and impedes terminal exhaustion, synergizing with TGF-β pathway inhibitors to enhance solid tumor-infiltrating T-cell function. In mesenchymal stem cell (MSC) expansion, it directs chondrogenic differentiation and augments immunomodulatory potency, providing molecular foundations for tissue-engineered grafts. Its activity is precisely regulated by latency-associated peptide (LAP) and integrin-mediated activation mechanisms, establishing a dynamic equilibrium exploitable for targeted interventions in fibrotic disorders and cancer immunotherapy.

Stability & Storage

Lyophilized powder: Stable for 12 months at -80°C or 6 months at -20°C when stored in the original sealed container under desiccant.

Reconstitution: Dissolve in sterile water for injection, 0.9% NaCl, or PBS (pH7.4), maintaining a final concentration ≥ 100 μg/mL to prevent adsorption. For 10 μg vial size, dissolve contents in 200 μL of the above solvents.

Handling: Aliquot to avoid repeated freeze-thaw cycles.

References

1. Kim KK, Sheppard D, Chapman HA. TGF-β1 Signaling and Tissue Fibrosis. Cold Spring Harb Perspect Biol. 2018 Apr 2;10(4):a022293.
2. de Streel G, Lucas S. Targeting immunosuppression by TGF-β1 for cancer immunotherapy. Biochem Pharmacol. 2021 Oct;192:114697.
3. Jeong JH, Jang HJ, Kwak S, *et al*. Novel TGF-β1 inhibitor antagonizes TGF-β1-induced epithelial-mesenchymal transition in human A549 lung cancer cells. J Cell Biochem. 2019 Jan;120(1):977-987.
4. Delaney K, Kasprzycka P, Ciemerych MA, *et al*. The role of TGF-β1 during skeletal muscle regeneration. Cell Biol Int. 2017 Jul;41(7):706-715.

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