

## Recombinant Human 4-1BB Ligand Protein

### Product Name

Recombinant Human 4-1BB Ligand Protein

### Size/Catalog Number

50µg / GMP-TL695-0050

100µg / GMP-TL695-0100

### Product Information

**Synonyms:** 4-1BB Ligand, TNFSF9, CD137L

**Accession:** Uniprot P41273

**Expressed Region:** Ala50-Glu254

**Fusion Tag:** Human IgG1 Fc fragment fused to C-terminus

**Expression system:** HEK293 cells

**Predicted Molecular Weight:** 51.0 kDa

**Purity:** > 90% as determined by SDS-PAGE

**Endotoxin Level:** < 0.1 EU per 1 µg protein (LAL assay)

**Activity:** Binds immobilized recombinant human 4-1BB/His Tag (1 µg/mL, 100 µL/well) with an  $ED_{50} \leq 50$  ng/mL in functional ELISA.

**Form:** Lyophilized from 20mM sterile phosphate-buffered saline (PBS), pH 7.4, normally containing 6–8% (w/v) mannitol as protectant

### Background

The recombinant human 4-1BB Ligand-Fc fusion protein is a functional dimeric immunomodulator produced in HEK-293 expression systems, featuring a C-terminal human IgG1 Fc domain to enhance structural stability and receptor clustering efficiency. As a TNF superfamily member (TNFSF9/CD137L), it activates NF-κB and MAPK signaling pathways through binding to 4-1BB (CD137/TNFRSF9) on T cells, delivering critical costimulatory signals that drive T-cell proliferation, IFN-γ/IL-2 secretion, and expansion of effector memory T-cell subsets, while suppressing activation-induced cell death (AICD) via upregulation of Bcl-xL. In cell therapy applications, this fusion protein serves as a pivotal component in ex vivo expansion systems, mimicking antigen-presenting cell (APC) costimulatory signals to significantly enhance CAR-T cell clonal expansion and persistence. It synergizes with CD28 signaling to optimize T-cell metabolic reprogramming and boost effector functions of tumor-infiltrating lymphocytes (TILs), providing functional support for solid tumor immunotherapy. The Fc domain design not only extends serum half-life but also ensures high-affinity trimeric engagement with 4-1BB receptors through spatial conformation optimization, enabling sustained signal activation.

### 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 (pH 7.4) maintaining final concentration  $\geq 100$  µg/mL to prevent adsorption.

**Handling:** Aliquot to avoid repeated freeze-thaw cycles.

### References

1. Eun SY, Lee SW, Xu Y, Croft M. 4-1BB ligand signaling to T cells limits T cell activation. *J Immunol.* 2015 Jan 1;194(1):134-41.
2. Macdonald DC, Hotblack A, Akbar S, Britton G, Collins MK, Rosenberg WC. 4-1BB ligand activates bystander dendritic cells to enhance immunization in trans. *J Immunol.* 2014 Nov 15;193(10):5056-64.
3. Meseck M, Huang T, Ma G, Wang G, Chen SH, Woo SL. A functional recombinant human 4-1BB ligand for immune costimulatory therapy of cancer. *J Immunother.* 2011 Mar;34(2):175-82.

**Intended Use**

For research and manufacturing purposes only.