

# PRODUCT INFORMATION



## 4-1BB/CD137 Extracellular Domain (human, recombinant)

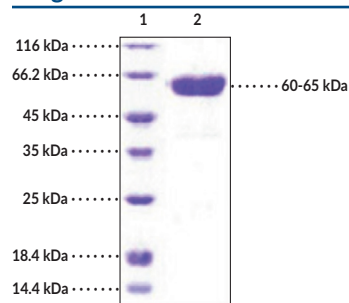
Item No. 31825

### Overview and Properties

<b>Synonyms:</b>	4-1BB Ligand Receptor, CDw137, ILA, TNFRSF9, Tumor Necrosis Factor Receptor Superfamily Member 9
<b>Source:</b>	Recombinant C-terminal human IgG1 Fc-His-tagged 4-1BB expressed in HEK293 cells
<b>Amino Acids:</b>	25-186
<b>Uniprot No.:</b>	Q07011
<b>Molecular Weight:</b>	45.2 kDa
<b>Storage:</b>	-80°C (as supplied)
<b>Stability:</b>	≥1 year
<b>Purity:</b>	≥95% estimated by SDS-PAGE
<b>Supplied in:</b>	Lyophilized from sterile PBS, pH 7.4
<b>Endotoxin Testing:</b>	<1.0 EU/μg, determined by the LAL endotoxin assay
<b>Bioactivity:</b>	See figures for details

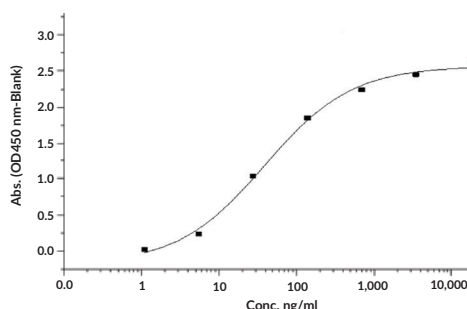
Information represents the product specifications. Batch specific analytical results are provided on each certificate of analysis.

### Images



Lane 1: MW Markers  
Lane 2: 4-1BB Extracellular Domain

**SDS-PAGE Analysis of 4-1BB Extracellular Domain.** This protein has a calculated molecular weight of 45.2 kDa. It has an apparent molecular weight of approximately 60 to 65 kDa by SDS-PAGE under reducing conditions due to glycosylation.



**Binding ability of 4-1BB Extracellular Domain.** Immobilized 4-1BB Extracellular Domain at 10 μg/ml (100 μl/well) can bind human S4-Fc3L3-TNFSF9/Biotin with a linear range of 1.28-20 μg/ml. The EC<sub>50</sub> of TNFSF9/Biotin is 20-60 ng/ml.

**WARNING**  
THIS PRODUCT IS FOR RESEARCH ONLY - NOT FOR HUMAN OR VETERINARY DIAGNOSTIC OR THERAPEUTIC USE.

**SAFETY DATA**  
This material should be considered hazardous until further information becomes available. Do not ingest, inhale, get in eyes, on skin, or on clothing. Wash thoroughly after handling. Before use, the user must review the [complete](#) Safety Data Sheet, which has been sent via email to your institution.

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**CAYMAN CHEMICAL**  
1180 EAST ELLSWORTH RD  
ANN ARBOR, MI 48108 · USA  
PHONE: [800] 364-9897  
[734] 971-3335  
FAX: [734] 971-3640  
CUSTSERV@CAYMANCHEM.COM  
WWW.CAYMANCHEM.COM

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## Description

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4-1BB, also known as CD137, is a type I transmembrane glycoprotein and member of the TNF receptor superfamily with roles in T cell-mediated immunity.<sup>1</sup> It is composed of an N-terminal extracellular domain comprised of a signaling sequence and four cysteine-rich pseudo repeats (CRDs), a helical transmembrane domain, and a cytoplasmic signaling domain.<sup>2</sup> 4-1BB is transiently expressed on antigen-primed activated T cells, activated natural killer (NK) cells, and mature dendritic cells. Binding of homotrimeric 4-1BB ligand on antigen-primed T cells induces NF- $\kappa$ B and MAPK signaling through TNF receptor-associated factors (TRAFs) and, when the T cell is co-stimulated by other factors, induces PI3K signaling.<sup>1,3</sup> This bidirectional signaling event promotes clonal expansion, differentiation, and survival of T cells, as well as polarizes T helper cells.<sup>4</sup> Knockout of *Tnfrsf9*, the gene encoding 4-1BB, reduces pancreatic islet accumulation of  $\beta$ -cell-autoreactive CD8<sup>+</sup> T cells in a mouse model of type 1 diabetes mellitus. Administration of an anti-4-1BB antibody prolongs survival and reverses renal damage, production of autoantibodies, and immune complex deposition in lupus-prone NZB X NZW F<sub>1</sub> mice. Cayman's 4-1BB/CD137 Extracellular Domain (human, recombinant) protein can be used for ELISA. This protein is a disulfide-linked homodimer. The reduced monomer, comprised of 4-1BB (amino acids 25-186) fused to His-tagged human IgG1 Fc at its C-terminus, consists of 409 amino acids, has a calculated molecular weight of 45.2 kDa, and a predicted N-terminus of Gln25 after signal peptide cleavage. As a result of glycosylation, the monomer migrates at approximately 60 to 65 kDa by SDS-PAGE under reducing conditions.

## References

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1. So, T. and Ishii, N. The TNF-TNFR family of co-signal molecules. *Co-signal molecules in T cell activation*. Azuma, M. and Yagita, H., editors, 1st edition, Springer (2019).
2. Chin, S.M., Kimberlin, C.R., Roe-Zurz, Z., et al. Structure of the 4-1BB/4-1BBL complex and distinct binding and functional properties of utomilumab and urelumab. *Nat. Commun.* **9**(1), 4679 (2018).
3. Barsoumian, H.B., Batra, L., Shrestha, P., et al. A novel form of 4-1BBL prevents cancer development via nonspecific activation of CD4<sup>+</sup> T and natural killer cells. *Cancer Res.* **79**(4), 783-794 (2019).
4. Wong, H.Y. and Schwarz, H. CD137 / CD137 ligand signalling regulates the immune balance: A potential target for novel immunotherapy of autoimmune diseases. *J. Autoimmun.* **112**, 102499 (2020).

CAYMAN CHEMICAL  
1180 EAST ELLSWORTH RD  
ANN ARBOR, MI 48108 · USA  
PHONE: [800] 364-9897  
[734] 971-3335  
FAX: [734] 971-3640  
CUSTSERV@CAYMANCHEM.COM  
WWW.CAYMANCHEM.COM