

## 4-1BB Ligand/TNFSF9 Protein, Rat, Recombinant (His)

### General Information

|                       |  |
|-----------------------|--|
| Synonyms:             | tumor necrosis factor (ligand) superfamily, member 9   |
| Protein Construction: | A DNA sequence encoding the rat TNFSF9 (Q80WE6) (Pro106-Gly308) was expressed, fused with a polyhistidine tag at the N-terminus. Predicted N terminal: His |
| Species:              | Rat  |
| Expression Host:      | HEK293 Cells   |
| Accession:            | Q80WE6   |
| Molecular Weight:     | 24.8 kDa (predicted); 35 kDa (reducing conditions)   |

### QC Testing

|                      |  |
|----------------------|--|
| Biological Activity: | Activity testing is in progress. It is theoretically active, but we cannot guarantee it. If you require protein activity, we recommend choosing the eukaryotic expression version first.   |
| Purity:              | > 88 % as determined by SDS-PAGE   |
| Endotoxin:           | < 1.0 EU/μg of the protein as determined by the LAL method.  |
| Formulation:         | Lyophilized from a solution filtered through a 0.22 μm filter, containing PBS, pH 7.4. Typically, a mixture containing 5% to 8% trehalose, mannitol, and 0.01% Tween 80 is incorporated as a protective agent before lyophilization. |

### Preparation and Storage

**Reconstitution:**  
A Certificate of Analysis (CoA) containing reconstitution instructions is included with the products. Please refer to the CoA for detailed information.

**Stability & Storage:**  
It is recommended to store recombinant proteins at -20°C to -80°C for future use. Lyophilized powders can be stably stored for over 12 months, while liquid products can be stored for 6-12 months at -80°C. For reconstituted protein solutions, the solution can be stored at -20°C to -80°C for at least 3 months. Please avoid multiple freeze-thaw cycles and store products in aliquots.

Actual storage temperature shall be subject to the COA.

**Shipping:**  
In general, lyophilized powders are shipped with blue ice, while solutions are shipped with dry ice.

### Protein Background

4-1BB ligand is the high affinity ligand of 4-1BB, also known as CD137L or TNFSF9. It is shown to be a type II surface glycoprotein belonging to the TNF superfamily. Expression of 4-1BBL is restricted to APCs, such as dendritic cells, macrophages, and activated B cells. Members of the TNF-TNF receptor superfamily have been shown to play critical roles in regulating cellular activation, differentiation and apoptosis. Several studies have reported that 4-1BBL/4-1BB interaction provided a co-stimulatory signal to T cells, and increased T cell proliferation and cytokines

production. In addition, 4-1BBL is involved in cancers, infectious diseases and autoimmune diseases. Cancer Immunotherapy Co-stimulatory Immune Checkpoint Targets Immune Checkpoint Immune Checkpoint Detection: Antibodies Immune Checkpoint Detection: ELISA Antibodies Immune Checkpoint Detection: FCM Antibodies Immune Checkpoint Detection: ICC Antibodies Immune Checkpoint Targets Immunotherapy Targeted Therapy

### Reference

- Cheung CT, (2007) Neutralizing anti-4-1BBL treatment improves cardiac function in viral myocarditis. Lab Invest. 87 (7): 651-61.
- Wang C, et al. (2009) Immune regulation by 4-1BB and 4-1BBL: complexities and challenges. Immunol Rev. 229(1): 192-215.
- HAbib-Agahi M, et al. (2009) 4-1BBL costimulation retrieves CD28 expression in activated T cells. Cell Immunol. 256 (1-2): 39-46.

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