



**LD Biopharma, Inc.**  
9924 Mesa Rim Road Suite B  
San Diego, CA 92121  
Tel: 858-876-8266  
<http://www.ldbiopharma.com>

## - PRODUCT DATA SHEET -

**Name of Product:** Recombinant Human TNFSF9 Protein  
**Catalog Number:** hRP-1647  
**Manufacturer:** LD Biopharma, Inc.

### Introduction

The protein encoded by human Tumor Necrosis Factor Ligand Superfamily member 9 (TNFSF9) gene is a cytokine that belongs to the tumor necrosis factor (TNF) ligand family. This transmembrane cytokine is a bidirectional signal transducer that acts as a ligand for TNFRSF9/4-1BB, which is a co-stimulatory receptor molecule in T lymphocytes. This cytokine and its receptor are involved in the antigen presentation process and in the generation of cytotoxic T cells. The receptor TNFRSF9/4-1BB is absent from resting T lymphocytes but rapidly expressed upon antigenic stimulation. The ligand encoded by this gene, TNFSF9/4-1BBL, has been shown to reactivate anergic T lymphocytes in addition to promoting T lymphocyte proliferation. This cytokine has also been shown to be required for the optimal CD8 responses in CD8 T cells. This cytokine is expressed in carcinoma cell lines, and is thought to be involved in T cell-tumor cell interaction.

Full-length mature human TNFSF8 cDNA (50 – 254 aa) was constructed with fully codon optimization DNA synthesis strategy and expressed in non-fusion form as inclusion bodies.. The final product was refolded using our unique “temperature shift inclusion body refolding” technology and chromatographically purified.

**Gene Symbol:** TNFSF9 (CD137L; 4-1BB-L)  
**Accession Number:** NP\_003802  
**Species:** Human  
**Size:** 25 µg / Vial  
**Composition:** 0.25 mg/ml, sterile-filtered, in 20 mM pH 8.0 Tris-HCl Buffer, with proprietary formulation of NaCl, KCl, EDTA, Sucrose and DTT.  
**Storage:** In Liquid. Keep at -80°C for long term storage. Product is stable at 4 °C for at least 30 days.

### Key References

Ma J, et al., *The TNF family member 4-1BBL sustains inflammation by interacting with*



**LD Biopharma, Inc.**  
9924 Mesa Rim Road Suite B  
San Diego, CA 92121  
Tel: 858-876-8266  
<http://www.ldbiopharma.com>

*TLR signaling components during late-phase activation. Sci Signal 6 (295), RA87 (2013)*

Moh MC, et al., *Tumor necrosis factor receptor 1 associates with CD137 ligand and mediates its reverse signaling. FASEB J. 27 (8), 2957-2966 (2013)*

Zhao S, et al., *CD137 ligand is expressed in primary and secondary lymphoid follicles and in B-cell lymphomas: diagnostic and therapeutic Implications. Am. J. Surg. Pathol. 37 (2), 250-258 (2013)*

Park SJ, et al., *Reverse signaling through the co-stimulatory ligand, CD137L, as a critical mediator of sterile inflammation. Mol. Cells 33 (6), 533-537 (2012)*

Arch RH et al., *4-1BB and Ox40 are members of a tumor necrosis factor (TNF)-nerve growth factor receptor subfamily that bind TNF receptor-associated factors and activate nuclear factor kappaB. Mol. Cell. Biol. 18 (1), 558-565 (1998)*

## **Applications**

1. May be used for in vitro human TNFSF9 mediated T cell activation regulatory with this protein as either as soluble factor or as coating matrix
2. May be used for specific antibody production.

## **Quality Control**

Purity: > 90% by SDS-PAGE.

## **Recombinant Protein Sequence**

GACPWAVSGARASPGSAASPRREGPELSPDDPAGLLDLRQGMFAQLVAQNVLIDGPLSWYSD  
PGLAGVSLTGGLSYKEDTKELVVAKAGVYYVFFQLELRRVVAGEGSGSVSLALHLQPLRSAAGA  
AALALTVDLPPASSEARNSAFGFQGRLLHLSAGQRLGVHLHTEARARHAWQLTQGATVGLGLFRV  
TPEIPAGLPSRSE

Before TEV cut:46.0 kD

MTLHRNEYGIASILDSYQCTAEISLADLATIFFAQFVQEATYKEVSKMKVDALTAIEKPTGDEQ  
SSGCLLENQLPAFLEELCHEKEILEKYGHSDCCSQSEEGRHNCFLAHKKPTPASIPLFQVPEPVT  
SCEAYEEDRETFMNF IYEIARRHPFLYAPTILLWAARYDKIIPSCCKAENAVECFQTKAATVT  
KELRESSGGSHHHHHHGSENLYFQGACPWAVSGARASPGSAASPRREGPELSPDDPAGLLDLR  
QGMFAQLVAQNVLIDGPLSWYSDPGLAGVSLTGGLSYKEDTKELVVAKAGVYYVFFQLELRRV



**LD Biopharma, Inc.**  
9924 Mesa Rim Road Suite B  
San Diego, CA 92121  
Tel: 858-876-8266  
<http://www.ldbiopharma.com>

VAGEGSGSVSLALHLQPLRSAAGAAALALTVDLPPASSEARNSAFGFQGRLLHLSAGQRLGVHL  
HTEARARHAWQLTQGATVLGLFRVTPEIPAGLPSRSE