

## NBL1 Protein, Human, Recombinant (His)

### General Information

Synonyms:	neuroblastoma 1, DAN family BMP antagonist;NO3;DAN;NB;D1S1733E;DAND1
Protein Construction:	A DNA sequence encoding the human DAN precursor (NP_005371.1) (Met 1-Asp 180) was expressed with a C-terminal polyhistidine tag. Predicted N terminal: Ala 16
Species:	Human
Expression Host:	HEK293 Cells
Accession:	P41271-1
Molecular Weight:	19.3 kDa (predicted); 27 kDa (reducing condition, due to glycosylation)

### QC Testing

Biological Activity:	Measured by its ability to inhibit BMP4-induced activity in MC3T3-E1 Mouse osteoblastic cells. The ED50 for this effect is typically 5-20 µg/ml in the presence of 25 ng/mL of recombinant human BMP4.
Purity:	> 98 % 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

The Dan (Differential screening-selected gene aberrative in neuroblastoma, also known as N03) gene was first identified as the putative rat tumor suppressor gene and encodes a protein structurally related to Cerberus and Gremlin in the vertebrates. It is a founding member of the DAN family of secreted proteins, acts as an inhibitor of cell cycle progression, and is closely involved in retinoic acid-induced neuroblastoma differentiation. There are at

least five mammalian protein members in the evolutionarily conserved Dan family including DAN, Gremlin/DRM, Cer1 (Cerberus-related), Dante, and PRDC (protein related to DAN and Cerberus), and share the C-terminal cystine-knot motif. As a secreted glycoprotein, DAN is a member of a class of glycoproteins shown to be secreted inhibitors of the transforming growth factor-beta (TGF-beta) and bone morphogenic protein pathways. It binds to BMPs and preventing their interactions with signaling receptor complexes, and accordingly regulates the processes of embryonic development and tissue differentiation. DAN gene product may have an important role in the regulation of the entry of cells into the S phase. Besides, the DAN gene product possesses an ability to revert phenotypes of transformed rat fibroblasts and represents a candidate tumor suppressor gene for neuroblastoma.

### Reference

Ozaki T, et al. (1995) Overexpression of DAN gene product in normal rat fibroblasts causes a retardation of the entry into the S phase. *Cancer Res.* 55(4): 895-900.

Nakamura Y, et al. (1997) A product of DAN, a novel candidate tumour suppressor gene, is secreted into culture medium and suppresses DNA synthesis. *Eur J Cancer.* 33(12): 1986-90.

Ogita J, et al. (2001) Expression of the Dan gene during chicken embryonic development. *Mech Dev.* 109(2): 363-5.

Kim AS, et al. (2003) Expression of the BMP antagonist Dan during murine forebrain development. *Brain Res Dev Brain Res.* 145(1): 159-62.

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