Cube Biotech
Alfred-Nobel-Str. 10 • 40789 Monheim • Germany
Phone: +49 (0)2173 993730
contact@cube-biotech.com
www.cube-biotech.com

MSP2N2 protein

Product	Catalog No.	Package size
MSP2N2, lyophilized protein (2 mg)	**26182**	**2 mg**
MSP2N2, lyophilized protein (10 mg)	**26186**	**5x2 mg**

Product Description

Nanodiscs were first described by Sligar and coworkers (1, 2). Nanodiscs provide a phospholipid bilayer system held together by membrane scaffold proteins (MSPs). MSPs are truncated forms of apolipoprotein (apo) A-I which wrap around a patch of a lipid bilayer to form a disc-like particle or nanodisc (3). MSPs provide a hydrophobic surface facing the lipids, and a hydrophilic surface at the outside. This setup makes nanodiscs highly soluble in aqueous solutions and allows for the solubilization of membrane proteins in the absence of detergents. These nanobilayer particles are about 7-17 nm in diameter, depending on the mutation variant of MSP used. Most widely employed are MSP1D1 and MSP1E3D1. Recently, larger membrane scaffold proteins of the MSP2 series have been generated to accommodate large membrane proteins and protein complexes (3). Most commonly used phospholipids are dimyristoyl-glycero-phosphocholine (DMPC) or palmitoyl-oleoyl-phosphatidylcholine (POPC) in combination with sodium cholate.

Cube Biotech offers MSP1D1, MSP1E3D1, MSP1D1ΔH5 and MSP2N2 his-tagged proteins, For some scaffold proteins, untagged variants are available on request. For use in cell-free expression reactions, pre-assembled nanodiscs and nanodisc assembly kits that contain the lyophilized proteins and pre-aliquoted amounts of lipids and sodium cholate are available. Nanodiscs are an important part of our membrane protein service offering. Both empty nanodiscs and recombinant membrane proteins reconstituted into nanodiscs are available. Please contact us for details.

Reconstitution of MSP protein

Cube Nanodisc membrane scaffold proteins are delivered lyophilized from a solution containing 20 mM Tris pH 7.4, 100 mM NaCl, 0.5 mM EDTA. Each aliquot contains 2 mg protein. Adding 0.5 mL double distilled water will restore the original solution with a protein concentration of 4 mg/mL. This stock can be diluted further as required by the different application protocols.

Technical details

Purity: > 90% (SDS-PAGE)
Number of amino acids: 371
Molecular mass: 43,05 kDa
Extinction coefficient (in water) ε_{280}: 36,900 $M^{-1}cm^{-1}$

Shipping & Storage

Shipment Temperature	Ambient temperature
Storage of lyophilized protein	-20°C for several months
Storage of reconstituted protein	2-8°C for several days

Protein overview and amino acid sequence

MSP2N2
Membrane scaffold protein 2N2

Legend: H0.5-H10: Helices 0.5-10, Helices 2-10 are repeated in the MSP2N2 variant.
The MSP2N2 protein is generated by TEV protease digest of MSP2N2-His protein, leaving one glycine residue at the N-terminus. After digest, TEV protease is removed by subtractive IMAC purification.

Helix 0.5 **Helix 2**
G STFSKLREQLG PVTQEFWDNLEKETEGLRQEMS

Helix 3 **Helix 4** **Helix 5**
KDLEEVKAKVQ PYLDDFQKKWQEEMELYRQKVE PLRAELQEGARQKLHELQEKLS

Helix 6 **Helix 7** **Helix 8**
PLGEEMRDRARAHVDALRTHLA PYSDELRQRLAARLEALKENGG ARLAEYHAKATEHLSTLSEKAK

Helix 9 **Helix 10** **Linker2** **Helix 2-II**
PALEDLRQGLL PVLESFKVSFLSALEEYTKKLNTQ GT PVTQEFWDNLEKETEGLRQEMS

Helix 3-II **Helix 4-II** **Helix 5-II**
KDLEEVKAKVQ PYLDDFQKKWQEEMELYRQKVE PLRAELQEGARQKLHELQEKLS

Helix 6-II **Helix 7-II** **Helix 8-II**
PLGEEMRDRARAHVDALRTHLA PYSDELRQRLAARLEALKENGG ARLAEYHAKATEHLSTLSEKAK

Helix 9-II **Helix 10-II**
PALEDLRQGLL PVLESFKVSFLSALEEYTKKLNTQ

Please note: His tag is cleaved off with TEV protease, protease removed by reverse IMAC

Additional Information

For nanodisc protocols, please visit our webpage at: www.cube-biotech.com/protocols. For background information on nanodiscs and possible applications please see http://www.cube-biotech.com/background-tips-and-tricks/what-are-nanodiscs. For protein affinity purification, Cube Biotech offers dedicated agarose resins, magnetic beads and prepacked cartridges. Also available are a range of ultrapure detergents and buffers for extraction and purification of proteins.
See www.cube-biotech.com/products for details.

Literature references

1. Bayburt, T.H. et al. Reconstitution and imaging of a membrane protein in a nanometer-size phospholipid bilayer. J. Struct. Biol. (1998), 123(1):37-44

2. Civjan, N.R. et al. Direct solubilization of heterologously expressed membrane proteins by incorporation into nanoscale lipid bilayers. BioTechniques (2003) 35:556-563

3. Grinkova Y.V et al. Engineering extended membrane scaffold proteins for self-assembly of soluble nanoscale lipid bilayers. Protein Engineering, Design & Selection (2010) vol. 23 no. 11 pp. 843–848