

## MSP1E3D1 protein

Product	Catalog No.	Package size
<b>MSP1E3D1, lyophilized protein (2 mg)</b>	<b>26162</b>	<b>2 mg</b>
<b>MSP1E3D1, lyophilized protein (10 mg)</b>	<b>26166</b>	<b>5 x 2 mg</b>

### 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 7-13 nm in diameter, depending on the mutation variant of MSP used. Most widely employed are MSP1D1, MSP1E3D1, and MSP1D1- $\Delta$ H5, but also other deletion or insertion mutants of MSP1D1 are suitable for the generation of nanodiscs (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 and MSP1D1 $\Delta$ H5 proteins, both as his-tagged and untagged versions. 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 nanodisc are available. Please contact us for details.

### Reconstitution of MSP protein

Cube Nanodisc membrane scaffold protein 1E3D1 is delivered lyophilized from a solution containing 20 mM Tris pH 7.4, 100 mM NaCl, 0.5 mM EDTA, 1 mM sodium azide. 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: 256  
 Molecular mass: 29,982  
 Extinction coefficient (in water)  $\epsilon_{280}$ : 26,930 M<sup>-1</sup>cm<sup>-1</sup>

### 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

MSP1E3D1  
Membrane scaffold protein 1E3D1

H0.5	H2	H3	H4	H5	H6	H4	H5	H6	H7	H8	H9	H10
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**Legend:** H0.5-H10: Helices 1-10. The E3 insertion consists of helices 4-6 (light green).

The MSP1E3D1 protein is generated by TEV protease digest of MSP1E3D1-His protein, leaving one glycine residue at the N-terminus.



## Additional Information

For nanodisc protocols, please visit our webpage at: [www.cube-biotech.com/protocols](http://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 affinity purification of tagged proteins, 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](http://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. Hagn, F. et al. Optimized phospholipid bilayer nanodiscs facilitate high-resolution structure determination of membrane proteins. *J. Am. Chem. Soc.* (2013), 135:1919-1925

**Disclaimer:** Our products are intended for molecular biology applications. These products are not intended for the diagnosis, prevention, or treatment of a disease.

Nanodiscs are protected by US Patents 7,691,414; 7,662,410; 7,622,437; 7,592,008; 7,575,763; 7,083,958; 7,048,949

**Proteins are our passion.**