PRODUCT INFORMATION

GRP78 (human, recombinant)

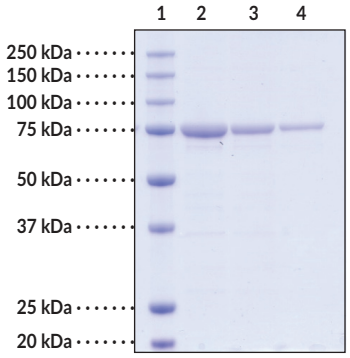
Item No. 22730

Overview and Properties

Synonyms:	BiP, Glucose-Regulated Protein 78, HspA5
Source:	Active N-terminal His-tagged human GRP78 protein expressed in *E. coli*
Amino acids:	2-654 (full length)
Uniprot No.:	P11021
Molecular Weight:	74.6 kDa
Storage:	-80°C (as supplied); avoid freeze/thaw cycles by storing protein in aliquots
Stability:	≥1 year
Purity:	≥85% estimated by SDS-PAGE
Supplied in:	50 mM HEPES, pH 8, 150 mM sodium chloride, 1 mM DTT, and 10% glycerol
Protein Concentration:	***batch specific*** mg/ml
Activity:	ATPase activity confirmed by ADP detection assay

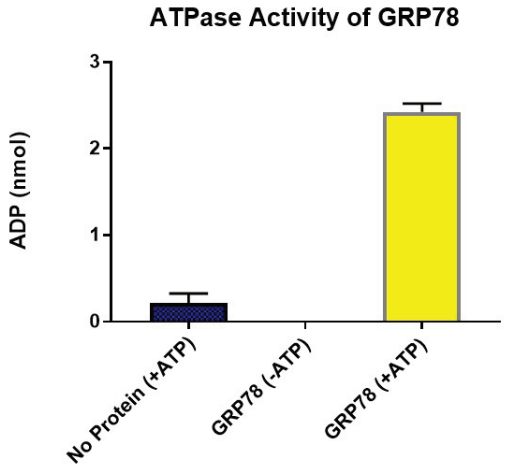
Information represents the product specifications. Batch specific analytical results are provided on each certificate of analysis.

Images



Lane 1: MW Markers
Lane 2: GRP78 (4 µg)
Lane 3: GRP78 (2 µg)
Lane 4: GRP78 (1 µg)

Representative gel image shown; actual purity may vary between batches.



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PRODUCT INFORMATION

Description

Glucose-regulated protein 78 kDa (GRP78), also known as heat shock 70 kDa protein 5 (HspA5) and immunoglobulin heavy chain-binding protein (BiP), is a glucose-regulated protein that is constitutively expressed in the lumen of the endoplasmic reticulum (ER).[1-3] It is composed of two functional domains, an N-terminal nucleotide-binding domain that contains an ATP catalytic site and a C-terminal substrate binding domain that binds hydrophobic polypeptides.[4] GRP78 functions as a molecular chaperone, assisting in the translocation of polypeptides from the cytosol into the ER, folding of nascent polypeptides, as well as refolding and preventing aggregation of misfolded proteins. It also plays a role in the ER-assisted degradation (ERAD) and unfolded protein response (UPR) pathways.[5,6] GRP78 chaperone activity is driven by an ATPase cycle that is regulated by ER-localized DnaJ-like protein co-factors and nuclear exchange factors.[7,8] Expression of GRP78 is upregulated in response to ER stress caused by viral and bacterial infections as well as various cancers.[9] ER stress can also promote extracellular secretion of GRP78 leading to its anti-inflammatory functions in immunity.[10]

References

1. Vogel, J.P., Misra, L.M., and Rose, M.D. Loss of BiP/GRP78 function blocks translocation of secretory proteins in yeast. *J. Cell. Biol.* **110(6)**, 1885-1895 (1990).
2. Simons, J.F., Ferro-Novick, S., Rose, M.D., *et al*. BiP/Kar2p serves as a molecular chaperone during carboxypeptidase Y folding in yeast. *J. Cell. Biol.* **130(1)**, 41-49 (1995).
3. Mayer, M.P. and Bukau, B. Hsp70 chaperones: Cellular functions and molecular mechanism. *Cell Mol. Life Sci.* **62(6)**, 670-684 (2005).
4. Yang, J., Nune, M., Zong, Y., *et al*. Close and allosteric opening of the polypeptide-binding site in a human Hsp70 chaperone BiP. *Structure* **23(12)**, 2191-2203 (2015).
5. Plemper, R.K., Böhmler, S., Bordallo, J., *et al*. Mutant analysis links the translocon and BiP to retrograde protein transport for ER degradation. *Nature* **388(6645)**, 891-895 (1997).
6. Okamura, K., Kimata, Y., Higashio, H., *et al*. Dissociation of Kar2p/BiP from an ER sensory molecule, Ire1p, triggers the unfolded protein response in yeast. *Biochem. Biophys. Res. Commun.* **279(2)**, 445-450 (2000).
7. Szabo, A., Langer, T., Schröder, H., *et al*. The ATP hydrolysis-dependent reaction cycle of the *Escherichia coli* Hsp70 system DnaK, DnaJ, and GrpE. *Proc. Natl. Acad. Sci. U.S.A.* **91(22)**, 10345-10349 (1994).
8. Behnke, J., Feige, M.J., and Hendershot, L.M. BiP and its nucleotide exchange factors Grp170 and Sil1: Mechanisms of action and biological functions. *J. Mol. Biol.* **42(7)**, 1589-1608 (2015).
9. Booth, L., Roberts, J.L., Cash, D.R., *et al*. GRP78/BiP/HSPA5/Dna K is a universal therapeutic target for human disease. *J. Cell. Physiol.* **230(7)**, 1661-1676 (2015).
10. Shields, A.M., Panayi, G.S., and Corrigall, V.M. Resolution-associated molecular patterns (RAMP): RAMParts defending immunological homeostasis. *Clin. Exp. Immunol.* **165(3)**, 292-300 (2011).

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