One of the most critical events in the biogenesis of a protein is the conversion of its linear amino acid sequence into the properly folded three-dimensional structure. As soon as a nascent polypeptide chain emerges from the ribosome, it is prone to misfolding and subsequent aggregation. Although many proteins may fold spontaneously, the initial folding of a significant number of cellular proteins requires the assistance of molecular chaperones. Thus chaperones are defined as proteins that assist other macromolecules in folding/unfolding and in assembly/disassembly of higher order structures without being components of these final structures. Several but not all stress proteins are molecular chaperones. A variety of co-chaperones are also present in the complexes with the heat shock proteins.

Protein folding occurs primarily in the cytoplasm (cytosolic protein folding for cytosolic proteins) and in the endoplasmic reticulum (ER) (oxidant protein folding for membrane associated or secreted proteins), like antibodies among many others. The differing redox and ionic milieus inside these two compartments, and the different functions and destinations of the client proteins folded therein, have necessitated the existence of distinct chaperone networks. Both networks exploit the exquisite sensitivity of cysteines to redox state, but they respond in opposite directions, reflecting the different conditions in the cytosol (reducing) and in the ER (more oxidizing, hence also called oxidant folding). Mechanistically, cysteines are the main targets, because their thiol groups can be modified according to redox changes in the environment by modifying protein conformation in a rapid and reversible way (reviewed in [1]). Peptidyl-prolyl cis-trans isomerases (PPIases) catalyse the interconversion of a peptide bond that precedes a proline residue from the trans (extended) to the cis (bent) position, which is often needed for proper protein folding.

**NAMING OF STRESS PROTEINS**

Until now no uniform system of naming stress proteins has been adopted but several helpful conventions are in broad use. Some designations are linked historically with the induction conditions such as heat shock protein (HSP) and glucose-regulated protein (GRP) followed by the estimated rounded molecular mass of the protein, e.g. HSP90. However molecular mass has become an inadequate criterion, as e.g. some heat shock proteins include a HSP70 domain with masses ranging from 16 to 170 kDa. Recently a proposal for a systematic nomenclature has been proposed by H. Sghaier, et al. [2].

**REFERENCES**


**E. coli PROTEINS**

<table>
<thead>
<tr>
<th>Construction</th>
<th>Recombinant</th>
<th>Size</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>ClpB (E. coli) (recombinant)</td>
<td>ALX-201-209-C00</td>
<td>100 µg</td>
<td>Recombinant E. coli ClpB produced in E. coli. LIT: Sequential mechanism of ubiquilinization and refolding of stable protein aggregates by a bichaperone network: P. Galoubimoff, et al.; PNAS 96, 17372 (1999)</td>
</tr>
<tr>
<td>DnaK (E. coli) (recombinant)</td>
<td>ALX-201-143-C05</td>
<td>25 µg</td>
<td>Recombinant E. coli DnaK (HSP70) produced in E. coli. LIT: The unfolding story of the Escherichia coli Hsp70 DnaK: is DnaK a holdase or an unfoldase?: S.V. Slepenkov &amp; S.N. Witt; Mol. Microbiol. 45, 1197 (2002)</td>
</tr>
<tr>
<td>DnaK (1-638) (E. coli) (recombinant)</td>
<td>ALX-201-217-C00</td>
<td>100 µg</td>
<td>Recombinant full length (aa1-638) E. coli DnaK (HSP70) produced in E. coli.</td>
</tr>
<tr>
<td>DnaK (ATPase Binding Domain) (1-384) (E. coli) (recombinant)</td>
<td>ALX-201-187-C00</td>
<td>100 µg</td>
<td>Recombinant ATPase binding domain (aa 1-384) of E. coli DnaK (HSP70) with an additional methionine attached at the N-terminus produced in E. coli.</td>
</tr>
<tr>
<td>DnaK (Substrate Binding Domain) (385-546) (E. coli) (recombinant)</td>
<td>ALX-201-186-C00</td>
<td>100 µg</td>
<td>Recombinant substrate binding domain (aa 385-546) of E. coli DnaK (HSP70) with an additional methionine attached at the N-terminus produced in E. coli.</td>
</tr>
<tr>
<td>DnaK (Substrate Binding Domain) (385-638) (E. coli) (recombinant)</td>
<td>ALX-201-188-C00</td>
<td>100 µg</td>
<td>Recombinant substrate binding domain (aa 385-638) of E. coli DnaK (HSP70) with an additional methionine attached at the N-terminus produced in E. coli.</td>
</tr>
<tr>
<td>DnaK (Substrate Covering Lid) (508-638) (E. coli) (recombinant)</td>
<td>ALX-201-189-C00</td>
<td>100 µg</td>
<td>Recombinant substrate covering lid domain (aa 508-638) of E. coli DnaK (HSP70) with an additional methionine attached at the N-terminus produced in E. coli.</td>
</tr>
<tr>
<td>HtpG (E. coli) (recombinant)</td>
<td>ALX-201-146-C025</td>
<td>25 µg</td>
<td>Recombinant HtpG (HSP90) produced in E. coli. LIT: Eukaryotic Mr 83,000 heat shock protein has a homologue in Escherichia coli. J.C. Bardwell &amp; E.A. Craig; PNAS 84, 5177 (1987)</td>
</tr>
<tr>
<td>Trigger Factor (TF) (E. coli) (recombinant) (His)</td>
<td>ALX-201-210-C025</td>
<td>25 µg</td>
<td>Recombinant trigger factor (TF) produced in E. coli with a C-terminal His-tag. LIT: The amino-terminal 118 amino acids of Escherichia coli trigger factor constitute a domain that is necessary and sufficient for binding to ribosomes. T. Heisterkamp, et al.; J. Biol. Chem. 272, 21855 (1997)</td>
</tr>
</tbody>
</table>

**AUXILIARIES**

**Chaperone Cocktail**

**ALX-850-307-KI01**

1 Set

Contains the following recombinant E. coli proteins produced in E. coli: ClpB (10µg), DnaK (10µg), DnaJ (2µg), GrpE (1µg), GroEL (10µg) and GroES (10µg). APPLICATION: This is a high power chaperone mix which mediates the ATP-dependent refolding of aggregated proteins (i.e. inclusion bodies).


**Protein Refolding Kit**

**AES-0600-1**

1 Kit

This kit is intended for the researcher who is working with a recombinant protein which is in an insoluble form such as inclusion bodies or aggregates from a bacterial, yeast or insect cell expression system. Because there is no means of determining a priori what the conditions should be for refolding a denatured protein, the researcher must empirically determine the best conditions for refolding a given protein. Athena’s Refolding Kit is designed to simplify the process of identifying the best refolding conditions. The kit is a screen based format which is based on a statistical experimental design. This allows the researcher to quickly identify the critical parameter affecting the refolding of their particular protein. The kit comes with 15 ready-to-use buffers, 10 ml each, and three vials containing powder reagents. These latter reagents are reconstituted before use and added to the respective buffers. The kit has sufficient materials to perform 10 refolding experiments. Importantly, the buffer formulations are disclosed which is critical to the interpretation of the results and necessary for performing the follow up optimization experiments.

**MABA-ATP**

**JBS-NJ-1303**

20 U

**JBS-NJ-1303L**

100 U

**YEAST**

In *Saccharomyces cerevisiae*, the ribosome-associated complex (RAC) recruits Ssb, which is a 70kDa heat shock protein, to bind nascent chains. Some proteins that might be initially bound by Ssb are assisted in folding by Ssa, which is the *S. cerevisiae* homolog of Hsc70.

**MAMMALS**

In mammals, as nascent polypeptide chains emerge from ribosomes they are met by the 70kDa heat shock cognate protein (Hsc70); expressed constitutively as compared to the stress-induced Hsp70, which is stimulated by its cofactor the 40kDa heat shock protein (Hsp40; also known as HDJ1) or by HDJ2. Some polypeptides fold with the assistance of Hsc70, whereas others are passed to the 90kDa heat shock protein (Hsp90). The tetratricopeptide repeat (TPR)-clamp co-chaperone Hsp-organizing protein (Hop) organizes the transfer of animal steroid-receptor proteins from Hsc70 onto Hsp90 and might function similarly for other substrate polypeptides. Other TPR-clamp co-chaperones help Hsc70 and Hsp90 in various functions. The immunophilin 52kDa FK506-binding protein (FKBP52) functions in Hsp90-dependent steroid-receptor folding, together with the Hsp90 co-chaperone p23. UNC-45 functions with Hsp90 in myosin folding. Cdc37 is unrelated to the TPR-clamp cofactors and works with Hsp90 in the folding of certain kinases, including inhibitor of nuclear factor-κB kinase (IKK), aurora B, protein kinase B (PKB; Akt), mitogen-activated protein kinase (MAPK), ErbB-1 (EGF receptor) and ErbB-2/HER2. TPR-clamp interactions also recruit Hsc70 and Hsp90 for protein sorting. Some mitochondrial precursor proteins are delivered by Hsc70 and Hsp90 to the import receptor 70kDa translocase of the outer mitochondrial membrane (TOM70) for import into the organelle.

**CHIP (human) (recombinant)**

**ALX-201-215-C025** 25 µg

Recombinant human CHIP (C-term of Hsp70 interacting protein) produced in E. coli. 


**HDJ1 (human) (recombinant)**

**ALX-201-211-C025** 25 µg

Recombinant human HDJ1 produced in E. coli. 

**LIT:** Regulation of the heat-shock protein 70 reaction cycle by the mammalian DnaJ homolog, Hsp40. Y. Minami, et al.; J. Biol. Chem. 271, 19617 (1996)

**HDJ2 (human) (recombinant)**

**ALX-201-212-C025** 25 µg

Recombinant human HDJ2 produced in E. coli. 


**HIP (human) (recombinant)**

**ALX-201-216-C025** 25 µg

Recombinant human HIP (Hsp70/Hsp90 interacting protein) produced in E. coli. 

**LIT:** GroEL-like regulation of the hsc70 chaperone by the anti-apoptotic protein BAG-1. J. Hohfeld and S. Jentsch; EMBO J. 14, 2281 (1995)

**Hop (human) (recombinant)**

**ALX-201-218-C025** 25 µg

Recombinant human Hop (Hsc70/Hsp90-organizing protein; SE1; stress-induced phosphoprotein 1) produced in E. coli.

**HSF1 (human) (recombinant)**

**ALX-201-024-C150** 150 µg

Recombinant human HSF1 (heat shock factor 1) produced in E. coli. 

**APPLICATION:** Positive control in gel shift assays (25 tests) or Western blot (50 tests) with Pab to HSF-1 (Prod. No. ALX-210-129). DNase I footprinting and in vitro translation assays.

**YeasProtein**

**Cdc37 (yeast) (recombinant)**

**ALX-201-148-C025** 25 µg

Recombinant yeast Cdc37 (cell division control protein 37) produced in E. coli. 

**LIT:** Regulation of Hsp90 ATPase activity by the co-chaperone Cdc37p/p08cdc37. G. Siogud, et al.; J. Biol. Chem. 277, 20151 (2002)

**Cpr6 (yeast) (recombinant)**

**ALX-201-150-C025** 25 µg

Recombinant yeast PPlase Cpr6 produced in E. coli. 

**LIT:** Cpr6 and Cpr1, two closely related Hsp90-associated immunophils from *Saccharomyces cerevisiae*, differ in their functional properties. C. Mayr, et al.; J. Biol. Chem. 275, 34140 (2000)

**HSP90 [HSP82] (yeast) (recombinant)**

**ALX-201-138-C025** 25 µg

Recombinant yeast Hsp90 (Hsp82) produced in E. coli. 


**SELECTED REVIEW ARTICLE**

For a Full Panel of Antibodies to HSPs see Page 4–5.

**E. coli**

Recombinant human HSF1 produced in insect cells. 

**LIT:** Identification of a regulatory motif in Hsp90 that affects ATPase activity, substrate binding and interaction with HDJ1. B.C. Freeman, et al.; EMBO J. 14, 2281 (1995)

**HSP70 (human) (recombinant)**

**ALX-201-214-C025** 25 µg

Recombinant human HSP70 produced in E. coli. 

**LIT:** Identification of a regulatory motif in Hsp90 that affects ATPase activity, substrate binding and interaction with HDJ1. B.C. Freeman, et al.; EMBO J. 14, 2281 (1995)

**HSP90 [HSP84] (human) (recombinant)**

**ALX-201-147-C025** 25 µg

Recombinant human HSP90 (HSP84) produced in insect cells. 


**HSP104 (yeast) (recombinant)**

**ALX-201-154-C025** 25 µg

Recombinant yeast HSP104 produced in E. coli. 

**LIT:** Purification and properties of Hsp104 from yeast. E.C. Schirmer & S. Lindquist; Meth. Enzymol. 290, 450 (1998)

**Sha1 (yeast) (recombinant)**

**ALX-201-149-C025** 25 µg

Recombinant yeast Sha1 produced in E. coli. Sha1 is homologous to vertebrate p23. 

**LIT:** Sha1 encodes a yeast hsp90 co-chaperone that is homologous to vertebrate p23 proteins. Y. Fang, et al.; Mol. Cell. Biol. 18, 3727 (1998)

**Sti1 (yeast) (recombinant)**

**ALX-201-151-C025** 25 µg

Recombinant yeast Sti1 produced in E. coli. 

**SIGNAL TRANSDUCTION**

**CYTOSOLIC PROTEIN FOLDING**

**HSP90**

HSP90 chaperone system for a steroid hormone receptor (SHR). The involvement of cofactors may change depending on the target protein. In the case of SHR, an inactive conformation of the receptor is captured by the molecular chaperone HSP70 (step 1). The co-chaperone Hop is recruited to establish a physical connection between HSP70 and HSP90. Presumably, ATP hydrolysis by HSP70 releases the bound SHR and transfers it to the HSP90 dimer, thus resulting in the formation of the intermediate complex (step 2). Transition to the mature complex is mediated by the replacement of both HSP70 and Hop with large peptidyl-prolyl cis-trans isomerases (PPIases) and another helper protein (p23) (step 3). Upon binding of its hormone ligand, the SHR is released from the mature complex, the receptor switches to its active conformation and migrates to the nucleus (step 4). In the absence of a hormone ligand, the receptor protein may participate in another cycle (step 5).


**SELECTED REVIEW ARTICLE**

3. [Folding-promoting agents in recombinant protein production: B. Fasth; Methods Mol. Biol. 267, 53 (2004)]
5. [Hydrogen exchange methods to study protein folding: M.M. Krishna, et al.; Methods 34, 51 (2004)]
6. [Protein folding studied by real-time NMR spectroscopy: M. Zeeb & J. Balbach; Methods 34, 65 (2004)]

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**ANTIBODIES TO HSPs**

**PAb to CHIP (human)**

**ALX-210-883-C100**

From rabbit. **IMMUNOGEN**: Synthetic peptide corresponding to aa 218-232 (K{DEKKKRED}D{P}YLC{232}) of human CHIP (C-terminus of HSC70 interacting protein). **SPECIFICITY**: Recognizes human CHIP. **APPLICATION**: WB. **BLOCKING PEPTIDE**: ALX-153-456.

**MAb to HSC70 (13D3)**

**ALX-804-067-R050**

**CLONE**: 13D3. **ISOTYPE**: Mouse IgM. **IMMUNOGEN**: Mouse spermatogenic cell protein. **SPECIFICITY**: Recognizes human and mouse HSC70 (heat shock cognate protein 70). **APPLICATION**: ICC, IP, WB.

**PAb to HSF1**

**ALX-210-129-R100**

From rabbit. **IMMUNOGEN**: Recombinant human HSF1 (heat shock factor 1). **SPECIFICITY**: Recognizes human, mouse and rat HSF1. Detects a band of ~83kDa by Western blot. **APPLICATION**: GS, IP, WB.

**PAb to HSF2 (human)**

**ALX-215-006-C200**

From rabbit. **IMMUNOGEN**: Synthetic peptide corresponding to aa 78-91 of human HSF2 (heat shock factor 2). **SPECIFICITY**: Recognizes human HSF2. **APPLICATION**: WB.

**PAb to HSP40 (human)**

**ALX-215-004-C200**

From rabbit. **IMMUNOGEN**: Synthetic peptide corresponding to aa 15–24 of human HSP40 (DJB1). **SPECIFICITY**: Recognizes human HSP40. **APPLICATION**: WB.

**PAb to HSP47 (human)**

**ALX-215-005-C200**

From rabbit. **IMMUNOGEN**: Synthetic peptide corresponding to aa 406–417 of human HSP47 (collagen 1). **SPECIFICITY**: Recognizes human HSP47. **APPLICATION**: WB.

**PAb to HSP56**

**ALX-210-125-C100**

From rabbit. **IMMUNOGEN**: Synthetic peptide corresponding to aa 406–417 of human HSP56 (HRRP99). **SPECIFICITY**: Recognizes human, mouse and rat HSP56. Detects a band of ~52-59kDa by Western blot. **APPLICATION**: WB.

**MAb to HSP60 (bacterial) (A57-B9)**

**ALX-804-072-R100**

**CLONE**: A57-B9. **ISOTYPE**: Mouse IgG2a. **IMMUNOGEN**: Recombinant *Chlamydial* trachomatis HSP60. **SPECIFICITY**: Recognizes all three genera of *Chlamydia* HSP60 with minimal cross-reactivity with *Borrelia burgdorferi* HSP60. Detects a band of ~60kDa by Western blot. Eptope mapping studies suggest binding at aa 517-522. Does not cross-react with *E. coli* GroEL or human HSP60. **APPLICATION**: ICC, IP, WB.

**MAb to HSP60 (bacterial) (A57-E4)**

**ALX-804-071-R100**

**CLONE**: A57-E4. **ISOTYPE**: Mouse IgG1. **IMMUNOGEN**: Recombinant *Chlamydial* trachomatis HSP60. **SPECIFICITY**: Recognizes bacterial HSP60 from *Chlamydia, E. coli* (GroEL), *Salmonella typhimurium, Neisseria gonorrhoeae*, and *Costella burnetii*. Detects a band of ~60kDa by Western blot. Does not cross-react with human HSP60. **APPLICATION**: WB.

Mab to HSP60 (human) (4B9/89)
ALX-804-069-C100 100 µg
CLONE: 4B9/89. ISOTYPE: Mouse IgG2a. IMMUNOGEN: Human placental HSP60. SPECIFICITY: Recognizes human HSP60.

Mab to HSP60 (human) (2E1/53)
ALX-804-070-C100 100 µg
CLONE: 2E1/53. ISOTYPE: Mouse IgG. IMMUNOGEN: Human placental HSP60. SPECIFICITY: Recognizes human HSP60.

Mab to HSP60 (yeast) (2G11-G6)
ALX-804-583-C200 200 µg
CLONE: 2G11-G6. ISOTYPE: Mouse IgG2b. IMMUNOGEN: Saccharomyces cerevisiae HSP60. SPECIFICITY: Recognizes yeast HSP60.
LIT: Does not cross-react with mammalian HSP60. E. coli GroEL or HSP60 from N. crassa. APPLICATION: WB.

Mab to HSP65 (mycobacterial) (4H11)
ALX-804-584-C100 100 µg
LIT: Does not cross-react with the mammalian HSP65 homologs from human, mouse and monkey, Drosophila, yeast or E. coli GroEL. APPLICATION: WB.

Mab to HSP70 (2A4)
ALX-804-075-R050 50 µl
CLONE: 2A4. ISOTYPE: Mouse IgM. IMMUNOGEN: Human HSP70. SPECIFICITY: Recognizes HSP70, Bc70, and following heat shock, HSP72 from a broad range of species including human, mouse, avian, frog, fish, fruit fly, yeast and wheat HSP70.
APPLICATION: IHC, IP, WB.

Mab to HSP70 (3A3)
ALX-804-047-R050 50 µl
CLONE: 3A3. ISOTYPE: Mouse IgG1. IMMUNOGEN: Recombinant human HSP70. SPECIFICITY: Recognizes several members of the HSP70 gene family including HSP70, Bc70, Grp78, and following heat shock, HSP72 from yeast, Drosophila, fish, mouse, avian, amphibian and human samples. Detects bands from ~70kDa --- ~78kDa by Western blot representing different members of the HSP70 family. APPLICATION: IHC, IHC (PS), IP, WB.

Mab to HSP70 (B70)
ALX-804-810-C100 100 µg
CLONE: B70. ISOTYPE: Mouse IgG2a. IMMUNOGEN: Chicken HSP70/HSP90 complex. SPECIFICITY: Recognizes both free and complexed human, mouse, rat, sheep, dog, pig, monkey, fish, guinea pig, hamster, rabbit, chicken, Xenopus, Drosophila and yeast HSP70 and Bc70. Detects bands of ~72kDa and ~75 kDa by Western blot, corresponding to HSP70 and Bc70, respectively. APPLICATION: IHC, IP, WB.

Mab to HSP70 (universal) (5A5)
ALX-804-074-R250 250 µl
CLONE: 5A5. ISOTYPE: Mouse IgG. IMMUNOGEN: Recombinant human HSP70. SPECIFICITY: Recognizes several members of the HSP70 gene family, including HSP70, Bc70, Grp78, and following heat shock, HSP72 in a broad range of species, from yeast to human, including mouse, avian, frog, fish, fruit fly, and wheat HSP70.
APPLICATION: ICC, IP, WB.
LIT: A 16-ki protein functions as a new regulatory protein for Hsc70 molecular chaperone and is identified as a member of the Nms2/nucleosome diphosphokinase kinase family: S.M. Leung and L.E. Hightower; J. Biol. Chem. 272, 2607 (1997).

Mab to HSP70 (universal) (7.10)
ALX-804-073-R050 50 µl
CLONE: 7.10. ISOTYPE: Rat IgG. IMMUNOGEN: Denatured Drosophila HSP70 (aa 437-479). SPECIFICITY: Recognizes several members of the HSP70 gene family including HSP70, Bc70, Grp78, and following heat shock, HSP72, in a broad range of species from yeast to human, including mouse, Drosophila, trypanosomes and soybeans. APPLICATION: WB.

Mab to HSP70 (human) (4G4)
ALX-804-076-R050 50 µl
APPLICATION: IP, WB.

Mab to HSP71 (mycobacterial) (5A8)
ALX-804-586-C200 200 µg
Mab to HSPBP1 (N-106)
GWY-A22009A-C100 100 µg
From chicken. IMMUNOGEN: Recombinant human HSPBP1 (HSP70 binding protein HSPBP1) (aa 31-136). SPECIFICITY: Recognizes chicken, mouse and rat HSP90.
APPLICATION: WB.

Mab to HSP90 (H90-10)
ALX-804-008-C100 100 µg
CLONE: H90-10. ISOTYPE: Mouse IgG2a. IMMUNOGEN: Purified human HSP90. SPECIFICITY: Recognizes human, mouse and rabbit HSP90 and HSP90. APPLICATION: ICC, IP, WB.

Pab to HSP90
GWY-A21241-C100 100 µg
From chicken. IMMUNOGEN: Synthetic peptide corresponding to aa 454-524 of recombinant human HSP90 (HSP96/HSPC). SPECIFICITY: Recognizes human, mouse and rat HSP90.
APPLICATION: WB.

Pab to HSP90 (K370S)
ALX-804-587-C100 100 µg
CLONE: K370S. ISOTYPE: Mouse IgM. IMMUNOGEN: Recombinant human HSP90. SPECIFICITY: Recognizes human, mouse, rat, hamster, guinea pig, bovine, dog, sheep, pig and chicken HSP90.
Does not cross-react with HSP90. APPLICATION: WB.

Pab to HSP90 Co-chaperone (JJ3)
ALX-804-023-R100 100 µl
CLONE: JJ3. ISOTYPE: Mouse IgG1. IMMUNOGEN: Recombinant human HSP90 co-chaperone (p23; telomerase-binding protein p25, progesterone receptor complex p23). SPECIFICITY: Recognizes human, mouse, chicken, rabbit and guinea pig HSP90 co-chaperone. Detects a band of ~23kDa by Western blot. APPLICATION: IP, WB.

Pab to HSP9014
ALX-804-138-R100 100 µg
From rabbit. IMMUNOGEN: Synthetic peptide corresponding to aa 894-908 (PHE[DINELMSIDYLDLD]) of C-terminal S. cerevisiae HSP104. SPECIFICITY: Recognizes human, mouse, hamster and yeast HSP104. Does not cross-react with HSP100 from prokaryotes, nor certain plants or insects including Drosophila. APPLICATION: IHC, IP, WB.

Pab to HSPBP1 (N-106)
GWY-A22009A-C100 100 µg
APPLICATION: WB.

Pab to HSPBP1 (C-143)
GWY-A22009B-C100 100 µg
APPLICATION: WB.
While the benzoquinone ansamycins 17-AAG, geldanamycin, herbimycin A and the chemically unrelated radicicol bind to the N-terminal ATP-binding domain of HSP90 family members (HSP90, Grp94 and TRAP-1) [1], novobiocin interacts with the C-terminal ATP-binding domain of HSP90 [2].


**HSP90 INHIBITORS**

While the benzoquinone ansamycins 17-AAG, geldanamycin, herbimycin A and the chemically unrelated radicicol bind to the N-terminal ATP-binding domain of HSP90 family members (HSP90, Grp94 and TRAP-1) [1], novobiocin interacts with the C-terminal ATP-binding domain of HSP90 [2].


**CHEMICAL STRUCTURES**

**HSP90 INHIBITORS**

While the benzoquinone ansamycins 17-AAG, geldanamycin, herbimycin A and the chemically unrelated radicicol bind to the N-terminal ATP-binding domain of HSP90 family members (HSP90, Grp94 and TRAP-1) [1], novobiocin interacts with the C-terminal ATP-binding domain of HSP90 [2].


**CHEMICAL STRUCTURES**

---

**PRODUCTS**

**17-AAG**

[17-(Allylamino)-17-desmethoxygeldanamycin]

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<td>ALX-380-091-C100</td>
<td>100 µg</td>
<td>Inhibitor of HSP90 binding to the N-terminal ATP-binding domain of HSP90 family members.</td>
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<td>ALX-380-091-M001</td>
<td>1 mg</td>
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**Geldanamycin**

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<td>ALX-380-054-C100</td>
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**Novobiocin . sodium salt**

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**Radicicol**

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<td>ALX-380-092-M001</td>
<td>1 mg</td>
<td>Isolated from Humicola fuscoatra. Antifungal macrocyclic lactone: antibiotic with antimalarial activity. Potent inhibitor of HSP90. Binds more strongly to HSP90 (nanomolar affinity) than to Gp96 (GRP94). Also binds to yeast HSP90. E. coli Hsp60 and Trap-1.</td>
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<tr>
<td>ALX-380-092-M005</td>
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</table>

**ANTIBODIES TO BAG-1**

[Bcl-2 ASSOCIATED ATHANOGENE-1; BAG-FAMILY MOLECULAR CHAPERONE REGULATOR-1]

**PAb to BAG-1 (Bur 1680)**

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
</table>

**PAb to BAG-1 (NT) (Bur 1735)**

<table>
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<th>Product Code</th>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
</table>

**PAb to BAG-1 (mouse) (CT) (Bur 1702)**

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
</table>

**PAb to BAG-1 (human) (AL169)**

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALX-210-011-R050</td>
<td>50 µg</td>
<td>From rabbit. IMMUNOGEN: Synthetic peptide corresponding to aa 26-46 (N-PheIleTyrProGlnSerProValGlu) of mouse BAG-1 (Bcl-2 associated athanogene-1). SPECIFICITY: Recognizes human BAG-1. APPLICATION: ICC, IHC (PS), WB.</td>
</tr>
</tbody>
</table>

For updated prices and additional information visit www.axxora.com, contact your local distributor, or call +41 61 926 89 89.
The endoplasmic reticulum (ER) is an organelle in which secretory or cell-surface proteins, as well as resident proteins of the secretory pathway are synthesized, folded and modified. The ER is also the principal site for calcium (Ca\(^{2+}\)) storage and Ca\(^{2+}\) signalling as well as the site for biosynthesis of steroids, cholesterol and other lipids. The ER relies on numerous resident chaperone proteins, a high level of Ca\(^{2+}\) and an oxidative environment to carry out these functions efficiently. Proteins that are translocated into the ER lumen undergo post-translational modifications and folding required for optimal function. Properly folded proteins exit from the ER and progress down the secretory pathway, whereas proteins that fail to attain their native state are eventually retro-translocated (or dislocated) across the ER membrane to be disposed of by cytosolic proteasomes. This process, known as **ER-associated degradation** (ERAD), is essential to prevent protein accumulation and aggregation in the ER. It seems that disulfide bonds are broken (reduced) before retro-translocation. Therefore, excessive oxidation (oxidative stress) can inhibit ERAD and cause protein aggregation leading to ER stress.

The ER is highly sensitive to alterations in Ca\(^{2+}\) homeostasis and perturbation of its environment. Thus, Ca\(^{2+}\) ionophores and inhibitors of glycosylation, can disrupt ER function, resulting also in ER stress. To survive this stress, the ER responds by triggering specific signalling pathways including the unfolded protein response (UPR) and the ER-overload response (EOR). The EOR is a poorly characterized pathway leading to activation of NF-κB by Ca\(^{2+}\) and reactive oxygen intermediates or species (ROS or RSO). This pathway is activated by accumulation of proteins within the ER membrane. The EOR is triggered during viral infection and also in some diseases involving protein folding defects.

Three ER-resident transmembrane proteins have been identified as proximal sensors during the UPR: the protein kinase IRE1, the protein kinase PERK (PKR-like ER kinase) and the basic leucine zipper transcription factor ATF6. Each of these proteins is constitutively expressed in all cells, is localized to the ER membrane, and is bound to the molecular chaperone BIP (also called GRP78), a soluble ER-resident molecular chaperone. When the ER is stressed, the trio of UPR transducers (IRE1, PERK, ATF6) releases from BIP and appears to be coordinately activated. By phosphorylating elf-2α, PERK transiently attenuates translation, limiting protein load in the stressed ER. ATF6 drives the transcriptional upregulation of many ER-resident proteins and folding assistants. IRE1 activates XBP1, which in turn induces transcription of factors that facilitate ER-associated degradation (ERAD). If the damage is too strong and homeostasis cannot be restored, the UPR ultimately initiates apoptosis. The ER stress and the UPR are frequently associated to pathologies, such as diabetes, ischemia and neurodegenerative disorders.

The ER stress-induced apoptosis is better described as an intrinsic apoptosis pathway (mitochondria and Bcl-2 family members), although it also relies on elements of the extrinsic pathway (cell-surface receptors). Like mitochondria, ER is an organelle involved in apoptosis execution and is a repository for both antiapoptotic and proapoptotic molecules. The list of antiapoptotic molecules includes ER chaperone proteins such as BIP, calreticulin or protein disulfide isomerase (PDI). Cytosolic molecular chaperones, such as HSP90 and HSP70, are also involved as regulatory factors with antiapoptotic or proapoptotic functions.

**SELECTED REVIEW ARTICLE**

properties. A significant fraction of endogenous Bcl-2 family proteins including Bcl-2, Bcl-X, and Bak have been shown to be associated with the ER, suggesting that Bcl-2 family members operate at the ER, at least in part, to regulate Ca\textsuperscript{2+} homeostasis and apoptotic cell death. Proapoptotic pathways emanating from the ER are mediated by different molecules such as PERK/CHOP, Ire1, caspase-4, caspase-12 and BAP31. Prolonged UPR activation leads to expression of transcription factor ATF4 through the PERK-eIF2 pathway. ATF4 then induces expression of the transcription factor CHOP/GADD153, which subsequently activates caspase-3 through unknown intermediates. Under ER stress, activated Ire1 recruits the cytosolic adapter TRAF2 (tumor necrosis receptor-associated factor 2), that signals through apoptosis-signalling kinase 1 (ASK1) and the JNK protein kinase to activate mitochondria/Apaf-1-dependent apoptosis.

BAP31 is an ER-membrane protein that forms homoooligomer and heterooligomer with the closely related BAP29. BAP31 exists in a complex with procaspase-8L (a longer isoform) and with Bcl-X. BAP31 is a substrate of caspase-8 and once cleaved into the shorter p20 fragment can direct proapoptotic signals between the ER and the mitochondria (Ca\textsuperscript{2+} release from the ER, concomitant uptake of Ca\textsuperscript{2+} into mitochondria followed by a release of cytochrome c).

**OXIDANT PROTEIN FOLDING & ER STRESS**

**CONTINUED**

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**PRODUCTS**

**MAb to ATF6 (70B1413)**

ALX-804-381-C100  100 µg

**CODE:** 70B1413. **ISOTYPE:** Mouse IgG1. **IMMUNOGEN:** Recombinant human ATF6 (activating transcription factor 6) containing aa 1-275. **SPECIFICITY:** Recognizes human and mouse ATF6. Detects a band of ~90kDa by Western blot. **APPLICATION:** WB.


**MAb to BAP31 (A1/182)**

ALX-806-601-C100  100 µg

For details see page 12.

**MAb to BAP31 (CC-1)**

ALX-806-812-C100  100 µg

For details see page 12.

**BiP (mouse) (recombinant)**

ALX-210-219-025  25 µg

Recombinant mouse BiP (GRP78; glucose regulated protein 78kDa) produced in E. coli.

**PAb to BiP**

ALX-210-137-100  100 µg

From rabbit. **IMMUNOGEN:** Synthetic peptide corresponding to aa 643-654 (T 643GEEDTSEKDEL654) of rat BiP (GRP78; glucose regulated protein 78kDa). **SPECIFICITY:** Recognizes mouse, rat and hamster BiP. Does not detect BiP from human cell lines or COS cells. **APPLICATION:** ICC, IP, WB.


**Calnexin (dog) (recombinant)**

ALX-210-220-025  25 µg

Recombinant dog calnexin (pp90) produced in E. coli.

**MAb to Calnexin (human) (AF18)**

ALX-804-014-R100  100 µl

**CLONE:** AF18. **ISOTYPE:** Mouse IgG1. **IMMUNOGEN:** Human hepatoma cell line (HepG2). **SPECIFICITY:** Recognizes human calnexin (pp90). Detects a band of ~90kDa by Western blot. **APPLICATION:** ICC, IP, WB.

**LIT:** The major histocompatibility complex class I antigen-binding protein pp92 is the product of the calnexin gene: R. Galvin, et al.; PNAS 89, 8452 (1992)

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LATEST INSIGHT

Pin1 is a phospho-Ser/Thr-Pro specific prolyl-isomerase and can catalytically induce conformational changes in proteins after phosphorylation, thereby having profound effects on catalytic activity, dephosphorylation, protein-protein interactions, subcellular localization and/or turnover of certain phosphorylated proteins.

Recently it has been shown that Pin1 is over-expressed in human breast cancer cell lines and cancer tissues and plays a critical role in the transformation of mammary epithelial cells by activating multiple oncogenic pathways. Pin1 expression is also an excellent independent prognostic marker in prostate cancer.

Pin1 may represent a common mediator linking proapoptotic cooperative activity of the p53 family members including p73.

Furthermore Pin1 binds to tau phosphorylated specifically at the Thr51-Pro site inducing conformational changes in tau. Such conformational changes can directly restore the ability of phosphorylated tau to bind microtubules and promote microtubule assembly and/or facilitate tau dephosphorylation by its phosphatase PP2A. Pin1 expression inversely correlates with the predicted neuronal vulnerability in normally aged brain and also with actual neurofibrilary degeneration in AD brain. Distinct from all other mouse models where transgenic overexpression of specific proteins elicits tau-related pathologies, Pin1 is the first protein whose depletion causes age-dependent neurodegeneration and tau pathologies.

Small heat shock proteins (sHSPs) are a large family of proteins with monomeric molecular weight of 12-43 kDa, present within the prokaryotic and eukaryotic cell as large oligomeric complexes, ranging in size from 200-800 kDa. Unlike the high molecular weight HSPs, which are involved in protein folding in vivo, under normal conditions, sHSPs play an important role in protecting the organism from stress. They share conserved regions in the C-terminal parts (the -crystallin domains), while the N-terminal part is quite different in sequence and length in different organisms. The conserved C-terminal domain exhibits high sequence homology to the family of -crystallins, which constitute a major part of the eye lens. sHSPs form large oligomeric complexes that are able to selectively bind non-native proteins in large quantities and maintain them in a refoldable conformation. For example, HSP26 form a 24-mer complex under physiological conditions. At heat shock temperatures, this complex dissociates thus performing efficient chaperone activity.

**SELECTED REVIEW ARTICLE**


**PRODUCTS**

**A-Crystallin (CRYAA) (human) (recombinant)**

ALX-201-191-C100 100 µg

Produced in E. coli.

**B-Crystallin (CRYAB) (human) (recombinant)**

ALX-201-192-C100 100 µg

Produced in E. coli.

**HSP12 (yeast) (recombinant)**

ALX-201-140-C025 25 µg

Recombinant yeast HSP12 produced in E. coli.

**HSP26 (yeast) (recombinant)**

ALX-201-139-C025 25 µg

Recombinant yeast HSP26 produced in E. coli.

**MAb to A-Crystallin (c9F2)**

ALX-804-582-R050 50 µl

ALX-804-582-R100 100 µl


**RELATED PRODUCTS**

**ER STRESS INDUCERS**

<table>
<thead>
<tr>
<th>Compound</th>
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<th>Mass</th>
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<tr>
<td>Thapsigargin</td>
<td>ALX-450-001-M001</td>
<td>1 mg</td>
</tr>
<tr>
<td>Tunicamycin</td>
<td>ALX-350-004-M001</td>
<td>1 mg</td>
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**CALCIUM IONOPHORES**

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<tr>
<td>A23187 (Calcimycin)</td>
<td>ALX-450-001-M001</td>
<td>1 mg</td>
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**IMMUNOSUPPRESSORS**

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<tr>
<td>Cyclosporin A</td>
<td>ALX-380-004-C100</td>
<td>100 µg</td>
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<td>Rapamycin</td>
<td>ALX-380-004-M001</td>
<td>1 g</td>
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**GOLGI VESICULATION INDUCER**

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<tbody>
<tr>
<td>Ilimaquinone</td>
<td>ALX-350-240-C100</td>
<td>100 µg</td>
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</table>

**ALX-804-582-R**

For updated prices and additional information visit www.axxora.com, contact your local distributor, or call +41 61 926 89 89.
The endoplasmic reticulum (ER) is a major site of protein synthesis in the cell. After translocation of nascent polypeptide chains into the ER, elaborated quality control mechanisms sort incorrectly from correctly folded proteins. Incorrectly folded proteins are retained by chaperones and, if folding is unsuccessful, degraded by the proteasome after retrotranslocalization to the cytosol. Correctly folded proteins destined either for different subcellular compartments or for secretion from the cell, leave the ER in COPII-coated vesicles to the ER-Golgi intermediate compartment (ERGIC) and subsequently move to the cis-Golgi by an unknown mechanism. The ERGIC, now best defined by the marker protein ERGIC-53, is composed of a constant average of equivalent and highly mobile tubulo-vesicular clusters. ERGIC-53 is a mannose-specific membrane lectin operating as a cargo receptor for transport to the ERGIC, 5) where upon acidification the lower pH leads to loss of Ca2+ inactivating the mannose binding domain of ERGIC. 6) Free ERGIC-53 is recruited to COP I-vesicle budding sites and 7) transported back (retrograde) to the ER. Figure kindly provided by Prof. H.-P. Hauri, University of Basel, Switzerland.

**Selected Review Article**


### PRODUCTS

<table>
<thead>
<tr>
<th>Name</th>
<th>Code</th>
<th>Format</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pab to Calreticulin (CT)</td>
<td>ALX-210-171-R100</td>
<td>100 µl</td>
<td>From chicken. IMMUNOGEN: Synthetic peptide corresponding to aa 23-45 of calreticulin. SPECIFICITY: Recognizes human, mouse, rat and hamster calreticulin. APPLICATION: WB. BLOCKING PEPTIDE: ALX-155-016.</td>
</tr>
<tr>
<td>Pab to Calreticulin (NT)</td>
<td>ALX-210-170-R100</td>
<td>100 µl</td>
<td>From chicken. IMMUNOGEN: Synthetic peptide corresponding to aa 23-45 of calreticulin. SPECIFICITY: Recognizes human, mouse, rat and hamster calreticulin. APPLICATION: HIC, FS, WB. BLOCKING PEPTIDE: ALX-155-017.</td>
</tr>
<tr>
<td>Pab to CLIMP-63 (G1/296)</td>
<td>ALX-804-604-C100</td>
<td>100 µg</td>
<td>IMMUNOGEN: Human CLIMP-63 (cytoskeleton-linking membrane protein of 65KDa; p65) from Caco-2 cell Golgi membrane fraction. SPECIFICITY: Recognizes human and monkey CLIMP-63. APPLICATION: ELISA, IHC, ICC, (FS), IP, WB. BLOCKING PEPTIDE: ALX-155-017.</td>
</tr>
<tr>
<td>Pab to ERGIC-32 (human)</td>
<td>ALX-804-602-C100</td>
<td>100 µg</td>
<td>IMMUNOGEN: Human ERGIC-32 (ERGIC membrane protein of 65KDa; p65) from Caco-2 cell Golgi membrane fraction. SPECIFICITY: Recognizes human and monkey CLIMP-63. APPLICATION: ELISA, IHC, ICC, (FS), IP, WB. BLOCKING PEPTIDE: ALX-155-017.</td>
</tr>
</tbody>
</table>

### INHIBITORS

**Okadaic acid (high purity)**
- ALX-350-003-C025: 25 µg
- ALX-350-003-C050: 50 µg
- ALX-350-003-C100: 100 µg
- ALX-350-003-M001: 1 mg

**Okadaic acid . ammonium salt (high purity)**
- ALX-350-010-C025: 25 µg
- ALX-350-010-C100: 100 µg
- ALX-350-010-M001: 1 mg

**Okadaic acid . potassium salt (high purity)**
- ALX-350-063-C050: 50 µg
- ALX-350-063-C100: 100 µg
- ALX-350-063-M001: 1 mg

**Inhibitor of intracellular protein transport and protein secretion, interfering with trafficking in the trans-Golgi network, leading to the accumulation of cycling proteins in ERGIC clusters. Blocks ADP-ribosylation factor (ARf) in an inactive GDP-bound conformation and thereby prevents binding of COPI coats to ERGIC and Golgi membranes. Upon brefeldin A treatment the Golgi rapidly tubulates and fuses with the ER by an energy-, temperature-, and microtubule-dependent process. In contrast, the drug has little effect on the ERGIC, which keeps its identity, although the ERGIC clusters become larger and more uniformly distributed in the cytoplasm of the cells.**

**Bafilomycin A1**
- ALX-380-030-C100: 100 µg
  - Macroside antibiotic that acts as a specific inhibitor of vacuolar-type H+ -ATPase. Inhibitor of endosomal acidification.

**Monensin . sodium salt**
- ALX-380-026-M100: 100 mg
- ALX-380-026-G001: 1 g
  - Antimicrobial that functions as Na+ ionophore. Blocks glycoprotein secretion.

**Nordihydroguaiaretic acid (NDGA)**
- ALX-350-086-G001: 1 g
  - Inhibits inducibly different ER-Golgi redistribution than induced by brefeldin A (ALX-350-019).

### PRODUCTS (CONTINUED)

#### MAb to Giantin (G1/133)

**ALX-804-600-C100 100 µg**  
**Clone:** G1.  
**Isotype:** Mouse IgG1.  
**Application:** ELISA, FC, ICC, IHC (FS), IP, WB.  
**Specificity:** Recognizes mammalian (including human, mouse and monkey) and avian giantin.

#### MAb to GPP130 (2F7.1)

**ALX-804-603-C100 100 µg**  
**Clone:** 2F7.1.  
**Isotype:** Mouse IgG1.  
**Application:** ELISA, FC, ICC, IHC (FS), IP, WB.  

#### PAb to KDEL/GRP78

**ALX-210-144-C100 100 µg**  
**From rabbit.**  
**Immunogen:** Synthetic peptide corresponding to aa 1-19 (M1GLETEKADVQLFMADDAY 19) of human caveolin-2.  
**Application:** FC, ICC, IP, WB.  
**LT:** Overexpression of an ADP-ribosylation factor–guanine nucleotide exchange factor (GIF1, a guanine nucleotide exchange factor) causes mislocalization of a type II early Golgi membrane protein to the endoplasmic reticulum: C. Shinotsuka et al.; J. Cell Biol. 279, 9483 (2002).

#### MAb to Mannose 6-phosphate Receptor (Golgin 261)

**ALX-604-274-C100 100 µg**  
**Clone:** 2G11.  
**Isotype:** Mouse IgG1.  
**Application:** Purified bovine 300kDa CI-MPR (cation independent mannose 6-phosphate receptor).  
**LT:** Purification of a cation independent mannose 6-phosphate receptor from bovine 300kDa CI-MPR (cation independent mannose 6-phosphate receptor).  
**Specificity:** Recognizes an epitope in the extracellular domain of human, bovine and monkey MPR (mannose 6-phosphate receptor).  
**Notes:** Does not cross-react with Chinese hamster MPR.  
**Applications:** ELISA, FC, ICC, IHC (FS), IP, WB.

#### MAb to Rab 9 (Mab9)

**ALX-804-286-R100 100 µl**  
**Clone:** Mab9.  
**Isotype:** Mouse IgG1.  
**Application:** Combinant human Rab 9.  

#### MAb to TBG38 (trans-Golgi Network 38) (rat) (2F7.1)

**ALX-804-095-R100 100 µl**  
**Isotype:** Mouse IgG1.  
**Application:** ELISA, FC, ICC, IHC, IP, WB.  

### CELL TRAFFICKING ANTIBODIES

#### MAb to ADP-ribosylation Factor-1 (1D9)

**ALX-804-082-R100 100 µl**  
**Clone:** 1D9.  
**Isotype:** Mouse IgG1.  
**Application:** Recombinant human ARF1 (ADP-ribosylation factor-1).  
**LT:** Recognizes mouse, rat, dog and hamster ARF1, ARF5, ARF6 and ARF6.  
**Applications:** FC, ICC, IP, WB.

#### MAb to Caveolin-1

**ALX-210-347-C100 100 µg**  
**From rabbit.**  
**Immunogen:** Synthetic peptide corresponding to aa 1-17 (M1SGGKYVDSEGHLYTVP17) of human caveolin-1.  
**Specificity:** Recognizes mouse, rat and hamster caveolin-1.  

#### MAb to Caveolin-2 (rat)

**ALX-210-240-C100 100 µg**  
**From rabbit.**  
**Immunogen:** Synthetic peptide corresponding to aa 19-45 (M1GLETExKIQDIVFMVADD50) of human caveolin-2.  
**Specificity:** Recognizes mouse caveolin-2.  
**LT:** Does not cross-react with other Rab family members.  
**Applications:** FC, ICC, IP, WB.

#### MAb to Caveolin-2 (phosphorylated) (pTyr149) (mouse)

**ALX-210-888-C100 100 µg**  
**From rabbit.**  
**Immunogen:** Synthetic peptide corresponding to aa 14-25 (M1ADDYpNSHBGC50) of mouse caveolin-2 phosphorylated at Tyr149.  
**Specificity:** Recognizes mouse phosphorylated caveolin-2.  
**LT:** Does not cross-react with other Rab family members.  
**Applications:** FC, ICC, IP, WB.

### CHEMICAL STRUCTURES

**Okadaic acid**  
**R = H**: Okadaic acid (Prod. No. 350-200)  
**R = OCH3**: ammmonium salt (Prod. No. 350-010)  
**R = OCH2CH3**: potassium salt (Prod. No. 350-053)  
**R = OCH3**: sodium salt (Prod. No. 350-011)

ER SECRETORY PATHWAY & CELL TRAFFICKING

CONTINUED

**ANTIBODIES (CONTINUED)**

**Pab to Caveolin-3 (rat)**  
**ALX-210-241-C100**  
100 µg

From rabbit. **IMMUNOGEN:** Synthetic peptide corresponding to aa 1-18 (MYVEEDITDLK) of human caveolin-3. This sequence is completely conserved in mouse caveolin-3. **SPECIFICITY:** Recognizes rat caveolin-3. Detects a band of ~21kDa by Western blot. **APPLICATION:** IP, WB. **BLOCKING PEPTIDE:** ALX-155-030.

**Mab to Clathrin (Heavy Chain) (X22)**  
**ALX-804-109-R100**  
100 µl

Clone: X22. **ISOTYPE:** Mouse IgG1. **IMMUNOGEN:** Purified human brain clathrin (heavy chain). **SPECIFICITY:** Recognizes human, mouse and bovine clathrin (heavy chain). Detects a band of ~180kDa by Western blot. **APPLICATION:** ICC, IP, WB. **LIF:** Clathrin structure characterized with monoclonal antibodies. I. Analysis of multiple antigenic sites: F.M. Brodsky; J. Cell Biol. 101, 207 (1985)

**Mab to Hrs [Hgs] and Hrs-2 (A-S)**  
**ALX-804-382-C050**  
50 µg


**Pab to Early Endosomal Antigen 1**  
**ALX-210-239-C100**  
100 µg

From rabbit. **IMMUNOGEN:** Synthetic peptide corresponding to aa 1391-1410 (TTSIKRPRVY2222MNDLQG) of human Hrs (early endosomal antigen 1). **SPECIFICITY:** Recognizes human, mouse, rat, dog and hamster HrsA1. Detects a band of ~180kDa by Western blot. **APPLICATION:** ICC, WB. **BLOCKING PEPTIDE:** ALX-155-033.

**Pab to Lysosome-Associated Membrane Protein-2 (mouse)**  
**ALX-210-206-R100**  
100 µl

From rabbit. **IMMUNOGEN:** Synthetic peptide corresponding to aa 490-441 (CGKLRHITDQEG) of the cytoplasmic domain of rat lysosome-associated membrane protein-2 (LAMP-2). This sequence is completely conserved between rat, mouse and guinea pig LAMP-2 protein. **SPECIFICITY:** Recognizes mouse LAMP-2. Detects bands of ~100-110kDa by Western blot. **APPLICATION:** WB. **BLOCKING PEPTIDE:** ALX-161-004.

**Pab to Rab 3A**  
**ALX-210-793-C100**  
100 µg

From rabbit. **IMMUNOGEN:** Synthetic peptide corresponding to aa 1-18 (M3ASATDSVRQYQQDSDQQ) of human Rab 3A. **SPECIFICITY:** Recognizes human, mouse, rat, hamster and dog Rab 3A. **APPLICATION:** IP, WB.

**Pab to Rab 3C (mouse)**  
**ALX-210-794-C100**  
100 µg

From rabbit. **IMMUNOGEN:** Synthetic peptide corresponding to aa 9-26 (M3ASATDSVRQYQQDSDQQ) of rat Rab 3C. **SPECIFICITY:** Recognizes mouse Rab 3C. Detects a band of ~22kDa by Western blot. **APPLICATION:** IP, WB.

**Pab to Rab 3D (mouse)**  
**ALX-210-855-C100**  
100 µg

From rabbit. **IMMUNOGEN:** Synthetic peptide corresponding to aa 1-18 (M3ASATDSVRQYQQDSDQQ) of rat Rab 3D. This sequence is completely conserved in mouse Rab 3D. **SPECIFICITY:** Recognizes mouse Rab 3D. Detects a band of ~29kDa by Western blot. Does not cross-react with Rab 3A, 3B or 3C. **APPLICATION:** WB.
ProFold™-CHAPERONE VECTORS & RELATED PRODUCTS

ProFold™-C1
ABV-A2  1 Set
ProFold™-C1 is your best choice if you do not know the behavior of the protein you intend to express. ProFold™-C1 provides the same level of protein expression as BacPAK6. In addition, it facilitates protein folding, often resulting in expression of soluble protein. For 5 transfections.

ProFold™-C2
ABV-A3  1 Set
ProFold™-C2 is your best choice if you do not know the behavior of the protein you intend to express. ProFold™-C2 provides the same level of protein expression as BacPAK6. Therefore, synthesis of protein of interest is slowed down and the protein is less likely to aggregate. Compared to ProFold™-C1, ProFold™-C2 provides much larger amount of HSP70, which, even if overexpressed without HSP70, can reduce protein aggregation. For 5 transfections.

ProFold™-ER1
ABV-A4  1 Set
ProFold™-ER1 is a vector of choice for expression of membrane or secreted proteins which are glycosylated. For 5 transfections.

Conventional Vector
Target protein production of up to 10-30% of total cell protein. Host cell cannot cope with folding of the overexpressed protein.

CHAPERONE VECTOR
Target protein production of up to 10-30% of total cell protein is supplemented with large amount of molecular chaperones.

Result:
Biologically active correctly folded protein

MOLECULAR CHAPERONE EXPRESSING HELPER VIRUSES

FoldHelper™-ER3
ABV-H6  2 ml
FoldHelper™-ER3 is a recombinant baculovirus which provides for the expression of Drosophila melanogaster heat-shock 70-kDa protein (HSP70). Its expression is slowed down and the protein is less likely to aggregate. FoldHelper™-ER3 is a recombinant baculovirus which provides for the expression of Drosophila melanogaster heat-shock 70-kDa Protein (HSP70), which, even if overexpressed without HSP70, can reduce protein aggregation. For 5 transfections.

FoldHelper™-57P [ERp57 & PDI]
ABV-H17  1 ml
FoldHelper™-57P [ERp57 & PDI] provides much larger amount of HSP40, which, even if overexpressed without HSP70, can reduce protein aggregation. For 5 transfections.

FoldHelper™-104 [HSP104]
ABV-H15  1 ml
FoldHelper™-104 [HSP104] provides much larger amount of HSP40, which, even if overexpressed without HSP70, can reduce protein aggregation. For 5 transfections.

FoldHelper™-104P [HSP104 & PDI]
ABV-H16  1 ml
FoldHelper™-104P [HSP104 & PDI] provides much larger amount of HSP40, which, even if overexpressed without HSP70, can reduce protein aggregation. For 5 transfections.

FoldHelper™-104 [HSP104 & PDI]
ABV-H18  1 ml
FoldHelper™-104 [HSP104 & PDI] provides much larger amount of HSP40, which, even if overexpressed without HSP70, can reduce protein aggregation. For 5 transfections.

FoldHelper™-P [PDI]
ABV-H19  1 ml
FoldHelper™-P [PDI] provides much larger amount of HSP40, which, even if overexpressed without HSP70, can reduce protein aggregation. For 5 transfections.

FoldHelper™-H [Hop]
ABV-H19  1 ml
FoldHelper™-H [Hop] provides much larger amount of HSP40, which, even if overexpressed without HSP70, can reduce protein aggregation. For 5 transfections.

C1 Kit [ProFold™-C1 & pVL1393]
ABV-K21  1 Kit
C2 Kit [ProFold™-C2 & pVL1393]
ABV-K22  1 Kit
ER1 Kit [ProFold™-ER1 & pAB-bee™]
ABV-K24  1 Kit
Green Kit [ProGreen™ & GC]
ABV-K25  1 Kit
Controls Kit [NC & GC]
ABV-K26  1 Kit

ALSO AVAILABLE

ProFold™-PDI
ABV-A7  1 Set
ProFold™-PDI is your best choice if you do not know the behavior of the protein you intend to express. ProFold™-PDI provides the same level of protein expression as BacPAK6. Therefore, synthesis of protein of interest is slowed down and the protein is less likely to aggregate. ProFold™-PDI provides much larger amount of HSP40, which, even if overexpressed without HSP70, can reduce protein aggregation. For 5 transfections.

ProFold™-PDI* ABV-A8  1 Set
ProFold™-PDI* provides much larger amount of HSP40, which, even if overexpressed without HSP70, can reduce protein aggregation. For 5 transfections.

ProFold™-0 ABV-A9  1 Set
ProFold™-0 provides much larger amount of HSP40, which, even if overexpressed without HSP70, can reduce protein aggregation. For 5 transfections.

ProGreen™ ABV-A1  1 Set
ProGreen™ is your best choice if you do not know the behavior of the protein you intend to express. ProGreen™ provides much larger amount of HSP40, which, even if overexpressed without HSP70, can reduce protein aggregation. For 5 transfections.

ABV-A1 to A9: For 5 transfections.

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