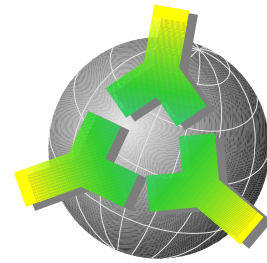


anti-Profilin

affinity purified rabbit antibody IG706

Lot: #188

Data Sheet: 200607018 — catalog #: 0022-01



immunoGlobe
Antikörpertechnik GmbH

Background information

Profilin is an ubiquitous small (12-15 kDa) phosphoinositides^{1,2} and poly-L-proline^{3,4} binding protein that plays a role both in signal transduction pathways⁵⁻¹⁰ and actin filament dynamics⁸⁻¹⁵. There are two mammalian profilins with similar biochemical properties^{16,17} but different expression patterns^{18,19}. Whereas profilin I appears to be highly expressed in most tissues except for skeletal muscle, profilin II is predominantly expressed in brain and at lower levels also in skeletal muscle, uterus and kidney^{18,19}. Profilin is a mainly cytosolic protein with higher concentrations in dynamic membrane areas like the leading edge and ruffling membranes^{20,21}.

Profilin binding to PIP₂ interferes with PIP₂ hydrolysis by soluble phospholipase C γ , an inhibition that can be overcome by tyrosine phosphorylation of PLC γ .³⁹ Besides actin monomer sequestration and stimulation of actin nucleotide exchange, profilin can also promote cellular actin filament growth⁸⁻¹⁵. Profilin is involved in the actin dependent intracellular motility of cytopathogenic bacteria²²⁻²⁷, the regulation of cell adhesion²⁸, and possibly also in linking the actin cytoskeleton and endocytosis¹⁹.

Profilin has been found to associate with defined complexes, containing proteins such as Arp2/3²⁹ or the Rho/Rac pathways constituents ROCK2 and HEM2/NAP1¹⁹. The profilin poly-L-proline binding site is primarily thought to anchor profilin at discrete subcellular sites. Ligands of this site include the focal adhesion proteins VASP³⁰ and Mena³¹, N-WASP⁴⁰, Spinal Muscular Atrophy Protein SMN⁴¹, and formin-related proteins like the mammalian Diaphanous homologue p140mDia³², *Drosophila* Cappuchino³³, *S. pombe* Cdc12p³⁴, as well as *S. cerevisiae* Bni1p^{35,36} and Bnr1p³⁶. In addition, dynamin I¹⁹ and annexin I³⁷ have also been characterized as profilin binding proteins.

Antibody preparation and storage

100 μ l of purified antibody in PBS containing 1 mg/ml BSA, 0.02% (w/v) NaN₃. Antibody

concentration: 100 μ g/ml. Vials have been overfilled by 10% to ensure complete recovery of the specified amount. Short term storage at 4°C, stable for one year from date of shipment when stored at -20°C. Avoid repeated freezing and thawing! Do not store in "frost-free" freezers.

Antigen

The antibody was raised against human profilin and has been affinity purified on the antigen.

Species cross-reactivity

human, porcine, mouse, rat, and marsupial profilin

Applications

Western (immuno) blotting (0.1-0.2 μ g/ml). The given dilutions refer to the analysis of mammalian cells and tissues with intermediate levels of profilin expression and must be viewed as approximate.

Positive control

Human platelet protein (500 μ g), supplied at 5 mg/ml in SDS sample buffer. Use 5 μ l (25 μ g) per lane for Western blotting of tricine gels (13% acrylamide)³⁸ or 15% Laemmli gels.

Related products

- affinity purified rabbit antibody to human VASP, 25 μ g (catalog # 0012-02)
- monoclonal mouse antibody IE273 to human VASP, 50 μ g (catalog # 0016-05)
- affinity purified rabbit antibody to human LPP, 50 μ g (catalog #0032-05)
- rabbit antiserum to human mDia, 100 μ l (catalog #0040-10)
- positive control: human platelet protein in SDS-stop solution, 500 μ g (catalog # 8010-50)

References

(*: papers referring to antibody IG706)

- [1] Lassing, I. & Lindberg, U. (1985) Specific interaction between phosphatidylinositol 4,5-bisphosphate and profilactin. *Nature* **314**:472-474.

. / . 2

- [2] Lu et al. (1996) Lipid products of phosphoinositide 3-kinase bind human profilin with high affinity *Biochemistry* **35**:14027-14034.
- [3] Tanaka & Shibata (1985) Poly(L-proline)-binding proteins from chick embryo are a profilin and a profilactin. *Eur. J. Biochem.* **151**:291-297.
- [4] Petrella et al. (1996) Structural requirements and thermodynamics of the interaction of proline peptides with profilin. *Biochemistry* **35**:16535-16543.
- [5] Goldschmidt-Clermont et al. (1990) The actin binding protein profilin binds to PIP₂ and inhibits its hydrolysis by phospholipase C. *Science* **247**:1575-1578.
- [6] Singh et al. (1996) Profilin and gelsolin stimulate phosphatidylinositol 3-kinase activity. *Biochemistry* **35**:16544-16549.
- [7] De Corte et al. (1997) Phosphatidylinositol 4,5-bisphosphate specifically stimulates pp60(c-src) catalyzed phosphorylation of gelsolin and related actin-binding proteins. *FEBS Lett.* **401**:191-196.
- [8] Machesky & Pollard (1993) Profilin as a potential mediator of membrane-cytoskeleton communication. *Trends Cell Biol.* **3**:381-385.
- [9] Sohn & Goldschmidt-Clermont (1994) Profilin: At the crossroads of signal transduction and the actin cytoskeleton. *BioEssays* **16**:465-472.
- [10] Schlüter et al. (1997) Profilins as regulators of actin dynamics. *Biochim. Biophys. Acta* **1359**:97-109.
- [11] Goldschmidt-Clermont et al. (1991) Mechanism of the interaction of human platelet profilin with actin. *J. Cell Biol.* **113**:1081-1089.
- [12] Theriot & Mitchison (1993) The three faces of profilin. *Cell* **75**:835-838.
- [13] Pantaloni & Carlier (1993) How profilin promotes actin filament assembly in the presence of thymosin β_4 . *Cell* **75**:1007-1014.
- [14] Carlier & Pantaloni (1994) Actin assembly in response to extracellular signals: role of capping proteins, thymosin β_4 and profilin. *Sem. Cell Biol.* **5**:183-191.
- [15] Perelroizen et al. (1996) Role of nucleotide exchange and hydrolysis in the function of profilin in actin assembly. *J. Biol. Chem.* **271**:12302-12309.
- [16] Gieselmann et al. (1995) Distinct biochemical characteristics of the two human profilin isoforms. *Eur. J. Biochem.* **229**:621-628.
- [17] Lambrechts et al. (1997) The mammalian profilin isoforms display complementary affinities for PIP₂ and proline-rich sequences. *EMBO J.* **16**:484-494.
- [18] Honore et al. (1993) Cloning and expression of a novel human profilin variant, profilin II. *FEBS Lett.* **330**:151-155.
- [19] Witke et al. (1998) In mouse brain profilin I and profilin II associate with regulators of the endocytotic pathway and actin assembly. *EMBO J.* **17**:967-976.
- [20] Buß et al. (1992) Distribution of profilin in fibroblasts correlates with the presence of highly dynamic actin filaments. *Cell Motil. Cytoskel.* **22**:51-61.
- [21] Mayboroda et al. (1997) Differential colocalization of profilin with microfilaments in PtK2 cells. *Cell Motil. Cytoskel.* **37**:166-177.
- [22] Theriot et al. (1994) Involvement of profilin in the actin-based motility of *L. monocytogenes* in cells and in cell-free extracts. *Cell* **76**:505-517.
- [23] Kocks (1994) Profilin puts pathogens on the actin drive. *Curr. Biol.* **4**:465-468.
- [24] Pollard (1995) Actin cytoskeleton. Missing link for intracellular bacterial motility? *Curr. Biol.* **5**:837-840.
- [25] Smith et al. (1996) The tandem repeat domain in the *Listeria monocytogenes* ActA protein controls the rate of actin based motility, the percentage of moving bacteria, and the localization of vasodilator stimulated phosphoprotein and profilin. *J. Cell Biol.* **135**:647-660.
- [26] Zeile et al. (1996) Recognition of two classes of oligoproline sequences in profilin-mediated acceleration of actin-based *Shigella* motility. *J. Cell Biol.* **133**:49-59.
- [27] Higley & Way (1997) Actin and cell pathogenesis. *Curr. Opin. Cell Biol.* **9**:62-69.
- [28] Moldovan et al. (1997) Regulation of endothelial cell adhesion by profilin. *Curr. Biol.* **7**:24-30.
- [29] Machesky et al. (1994) Purification of a cortical complex containing two unconventional actins from *Acanthamoeba* by affinity chromatography on profilin-agarose. *J. Cell Biol.* **127**:107-115.
- [30] Reinhard et al. (1995) The proline-rich focal adhesion and microfilament protein VASP is a ligand for profilins. *EMBO J.* **14**:1583-1589.
- [31] Gertler et al. (1996) Mena, a relative of VASP and *Drosophila Enabled*, is implicated in the control of microfilament dynamics. *Cell* **87**:227-239.
- [32] Watanabe et al. (1997) p140mDia, a mammalian homolog of *Drosophila diaphanous*, is a target protein for Rho small GTPase and is a ligand for profilin. *EMBO J.* **16**:3044-3056.
- [33] Manseau et al. (1996) Profilin is required for posterior patterning of the *Drosophila* oocyte. *Development* **122**:2109-2116.
- [34] Chang et al. (1997) Cdc12p, a protein required for cytokinesis in fission yeast, is a component of the cell division ring and interacts with profilin. *J. Cell Biol.* **137**:169-182.
- [35] Evangelista et al. (1997) Bni1p, a yeast formin linking cdc42p and the actin cytoskeleton during morphogenesis. *Science* **276**:118-122.
- [36] Imamura et al. (1997) Bni1p and Bnr1p: downstream targets of the Rho family small G-proteins which interact with profilin and regulate actin cytoskeleton in *Saccharomyces cerevisiae*. *EMBO J.* **16**:2745-2755.
- [37] Alvarez-Martinez et al. (1996) Characterization of the interaction between annexin I and profilin. *Eur. J. Biochem.* **238**:777-784.
- [38] Schägger & von Jagow, G. (1987) Tricine-sodium dodecyl sulfate-polyacrylamide gel electrophoresis for the separation of proteins in the range from 1 to 100 kDa. *Anal. Biochem.* **166**:368-379.
- [39] Goldschmidt-Clermont et al. (1991) Regulation of phospholipase C- γ 1 by profilin and tyrosine phosphorylation. *Science* **251**:1231-1233.
- [40] Suetsugu et al. (1998) The essential role of profilin in the assembly of actin for microspike formation. *EMBO J.* **17**:6516-6526.
- * [41] Gieselmann et al. (1999) A role for polyproline motifs in the Spinal Muscular Atrophy Protein SMN. *J. Biol. Chem.* **274**:37908-37914.
- * [42] Hauser, et al. (1999) Megakaryocyte hyperplasia and enhanced agonist-induced platelet activation in vasodilator-stimulated phosphoprotein knockout mice. *Proc. Natl. Acad. Sci. U S A* **96**:8120-8125.
- * [43] Salazar et al. (1999) Coordinate induction of the actin cytoskeletal regulatory proteins gelsolin, vasodilator-stimulated phosphoprotein, and profilin during capillary morphogenesis in vitro. *Exp. Cell Res.* **249**:22-32.
- * [44] Peitsch et al. (2001) Debrin particles: components in the ensemble of proteins regulating actin dynamics of lamellipodia and filopodia. *Eur. J. Cell Biol.* **80**:567-579.

for research use only — not for human, in vivo,
diagnostic, therapeutic or other uses