

BACKGROUND

Prohibitins belong to the Band-7 family of proteins and are ubiquitously expressed, multifunctional proteins implicated in cellular processes including mitochondrial function and protein folding, proliferation control and suppression of oncogenesis, apoptosis, and transcription regulation. They are mainly localized to mitochondria. The eukaryotic mitochondrial prohibitin (PHB) complex comprises two highly homologous subunits, PHB-1 and PHB-2 (around 50% amino acid sequence identity and 60% similarity). PHB-1 and PHB-2, with molecular weights of 32 and 34 kDa respectively, associate to form a ring-like macromolecular structure of approximately 1 MD with a diameter of 20-25 nm. This high molecular weight complex has been identified in yeast, *Caenorhabditis elegans* and mammals. PHB contains an N-terminal hydrophobic membrane anchoring α 1-helix domain and a C-terminal leucine/isoleucine-rich motif that acts as a nuclear export signal. PHB-1 and PHB-2 are interdependent for protein complex formation, and elimination of either PHB-1 or PHB-2 results in the absence of the whole PHB complex. The PHB complex sits at the mitochondrial inner membrane facing the inter membrane space. Several roles have been proposed for mitochondrial prohibitins. First, the PHB complex was suggested to regulate membrane protein degradation by the mitochondrial m-AAA protease. Later, a function as a membrane-bound chaperone, which holds and stabilizes newly synthesized mitochondrial-encoded proteins was proposed. PHB proteins might also play a role in stabilizing the mitochondrial genome. In addition, the PHB complex has been implicated in mitochondrial morphogenesis by stabilizing OPA-1, and by functioning as scaffold proteins that recruit membrane proteins to a specific lipid environment.¹ In addition, PHB-1 also presents in the nucleus, involved in regulation of transcription. Moreover, it can be found in the plasma membrane and cytoplasm. It has been demonstrated that PHB-1 is involved in phosphatidylinositol-3-kinase (PI3K)/protein kinase B (Akt) and transforming growth factor-beta (TGF-beta)/signal transducers and activators of transcription signaling pathways, and Ras/mitogen-activated protein kinase (MAPK)/extracellular signal-regulated kinase (ERK) signaling. PHB-1 might also function as a cell-surface receptor for an as-yet unidentified ligand. Cell-associated PHB-1 in the gastrointestinal tract has been implicated in protection against infection and inflammation and the induction of apoptosis in other tissues. In addition, Acting as a binding site for ubiquitin, prohibitin protein regulates protein degradation by proteasome. Moreover, it was shown that prohibitin recruits chromatin-remodeling molecules to gene promoter elements for transcriptional repression. In addition to transcriptional repression, prohibitin can induce p53-mediated transcription, indicating that

prohibitin may have dual functions in modulating transcription.² In recent years, over-expression of prohibitin has been detected in some tumor cells, including lung cancer, prostate cancer, cervical cancer, bladder cancer, gastric cancer, and breast cancer. Moreover, prohibitin may exert different functional roles, it has a permissive action on tumor growth or acts as an oncosuppressor. The diverse array of functions of PHB-1, together with the emerging evidence that its function can be modulated specifically in certain tissue, suggest that targeting PHB-1 would be a useful therapeutic approach for the treatment of variety of disease states, including inflammation, obesity and cancer.³

References:

1. Wang, S. & Faller, D.V.: Transl. Oncogenomics 3:23-7, 2008
2. Theiss, A.L. et al: Mol. Biol. Cell. 20:4412-23, 2009
3. Jia, L. et al: Neoplasia 58:104-9, 2011

TECHNICAL INFORMATION

Source:

PHB-1 Antibody is a mouse monoclonal antibody raised against recombinant human PHB-1 fragments expressed in *E. coli*.

Specificity and Sensitivity:

This antibody detects PHB-1 proteins in various cell lysate.

Storage Buffer: PBS and 30% glycerol

Storage:

Store at -20°C for at least one year. Store at 4°C for frequent use. Avoid repeated freeze-thaw cycles.

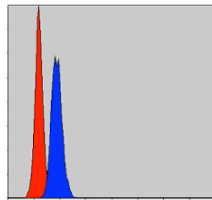
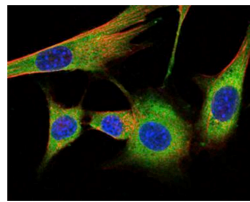
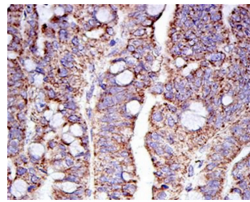
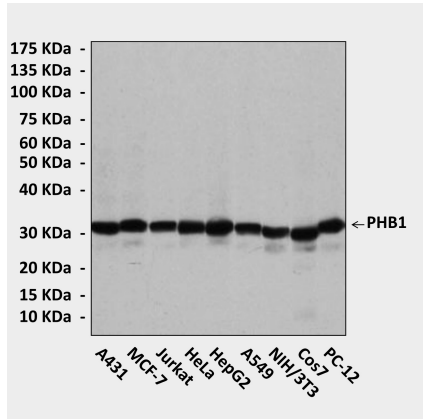
APPLICATIONS

Application:	*Dilution:
WB	1:1000
IP	n/d
IHC (Paraffin)	1:50-200
ICC	1:50-200
FACS	1:50-200

**Optimal dilutions must be determined by end user.*



QUALITY CONTROL DATA



Top: Western blot detection of PHB1 proteins in various cell lysates using PHB1 Antibody. **Middle, Upper:** It also stains paraffin-embedded human rectum cancer tissue in IHC analysis. **Middle, Lower:** This antibody stains NIH3T3 cells in confocal immunofluorescent testing (PHB1 Antibody: Green; Actin filaments: Red; DRAQ5 DNA Dye: Blue). **Bottom:** This antibody detects PHB1 proteins specifically in MCF7 cells by FACS assay (PHB1 Antibody: Blue; negative control: Red).

