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PLK1 Antibody (C-term)

Purified Rabbit Polyclonal Antibody (Pab)
Catalog # AP7937a

Product Information

Application	WB, IHC-P, E
Primary Accession	P53350
Other Accession	Q07832
Reactivity	Human, Rat, Mouse
Predicted	Mouse, Bovine, Canine, Rabbit
Host	Rabbit
Clonality	Polyclonal
Isotype	Rabbit IgG
Calculated MW	68255
Antigen Region	573-603

Additional Information

Gene ID	5347
Other Names	Serine/threonine-protein kinase PLK1, Polo-like kinase 1, PLK-1, Serine/threonine-protein kinase 13, STPK13, PLK1, PLK
Target/Specificity	This PLK1 antibody is generated from rabbits immunized with a KLH conjugated synthetic peptide between 573-603 amino acids from the C-terminal region of human PLK1.
Dilution	WB~~1:1000 IHC-P~~1:100~500 E~~Use at an assay dependent concentration.
Format	Purified polyclonal antibody supplied in PBS with 0.09% (W/V) sodium azide. This antibody is prepared by Saturated Ammonium Sulfate (SAS) precipitation followed by dialysis against PBS.
Storage	Maintain refrigerated at 2-8°C for up to 2 weeks. For long term storage store at -20°C in small aliquots to prevent freeze-thaw cycles.
Precautions	PLK1 Antibody (C-term) is for research use only and not for use in diagnostic or therapeutic procedures.

Protein Information

Name	PLK1
Synonyms	PLK
Function	Serine/threonine-protein kinase that performs several important functions

throughout M phase of the cell cycle, including the regulation of centrosome maturation and spindle assembly, the removal of cohesins from chromosome arms, the inactivation of anaphase- promoting complex/cyclosome (APC/C) inhibitors, and the regulation of mitotic exit and cytokinesis (PubMed:11202906, PubMed:12207013, PubMed:12447691, PubMed:12524548, PubMed:12738781, PubMed:12852856, PubMed:12939256, PubMed:14532005, PubMed:14734534, PubMed:15070733, PubMed:15148369, PubMed:15469984, PubMed:16198290, PubMed:16247472, PubMed:16980960, PubMed:17081991, PubMed:17351640, PubMed:17376779, PubMed:17617734, PubMed:18174154, PubMed:18331714, PubMed:18418051, PubMed:18477460, PubMed:18521620, PubMed:18615013, PubMed:19160488, PubMed:19351716, PubMed:19468300, PubMed:19468302, PubMed:19473992, PubMed:19509060, PubMed:19597481, PubMed:23455478, PubMed:23509069, PubMed:28512243, PubMed:8991084). Polo-like kinase proteins act by binding and phosphorylating proteins that are already phosphorylated on a specific motif recognized by the POLO box domains (PubMed:11202906, PubMed:12207013, PubMed:12447691, PubMed:12524548, PubMed:12738781, PubMed:12852856, PubMed:12939256, PubMed:14532005, PubMed:14734534, PubMed:15070733, PubMed:15148369, PubMed:15469984, PubMed:16198290, PubMed:16247472, PubMed:16980960, PubMed:17081991, PubMed:17351640, PubMed:17376779, PubMed:17617734, PubMed:18174154, PubMed:18331714, PubMed:18418051, PubMed:18477460, PubMed:18521620, PubMed:18615013, PubMed:19160488, PubMed:19351716, PubMed:19468300, PubMed:19468302, PubMed:19473992, PubMed:19509060, PubMed:19597481, PubMed:23455478, PubMed:23509069, PubMed:28512243, PubMed:8991084). Phosphorylates BORA, BUB1B/BUBR1, CCNB1, CDC25C, CEP55, ECT2, ERCC6L, FBXO5/EMI1, FOXM1, KIF20A/MKLP2, CENPU, NEDD1, NINL, NPM1, NUDC, PKMYT1/MYT1, KIZ, MRE11, PPP1R12A/MYPT1, POLQ, PRC1, RACGAP1/CYK4, RAD51, RHNO1, SGO1, STAG2/SA2, TEX14, TOPORS, p73/TP73, TPT1, WEE1 and HNRNPU (PubMed:11202906, PubMed:12207013, PubMed:12447691, PubMed:12524548, PubMed:12738781, PubMed:12852856, PubMed:12939256, PubMed:14532005, PubMed:14734534, PubMed:15070733, PubMed:15148369, PubMed:15469984, PubMed:16198290, PubMed:16247472, PubMed:16980960, PubMed:17081991, PubMed:17218258, PubMed:17351640, PubMed:17376779, PubMed:17617734, PubMed:18174154, PubMed:18331714, PubMed:18418051, PubMed:18477460, PubMed:18521620, PubMed:18615013, PubMed:19160488, PubMed:19351716, PubMed:19468300, PubMed:19468302, PubMed:19473992, PubMed:19509060, PubMed:19597481, PubMed:22325354, PubMed:23455478, PubMed:23509069, PubMed:25986610, PubMed:26811421, PubMed:28512243, PubMed:37440612, PubMed:37674080, PubMed:8991084). Plays a key role in centrosome functions and the assembly of bipolar spindles by phosphorylating KIZ, NEDD1 and NINL (PubMed:16980960, PubMed:19509060). NEDD1 phosphorylation promotes subsequent targeting of the gamma-tubulin ring complex (gTuRC) to the centrosome, an important step for spindle formation (PubMed:19509060). Phosphorylation of NINL component of the centrosome leads to NINL dissociation from other centrosomal proteins (PubMed:12852856). Involved in mitosis exit and cytokinesis by phosphorylating CEP55, ECT2, KIF20A/MKLP2, CENPU, PRC1 and RACGAP1 (PubMed:12939256, PubMed:16247472, PubMed:17351640, PubMed:19468300, PubMed:19468302). Recruited at the central spindle by phosphorylating and docking PRC1 and KIF20A/MKLP2; creates its own docking sites on PRC1 and KIF20A/MKLP2 by mediating phosphorylation of

sites subsequently recognized by the POLO box domains (PubMed:12939256, PubMed:17351640). Phosphorylates RACGAP1, thereby creating a docking site for the Rho GTP exchange factor ECT2 that is essential for the cleavage furrow formation (PubMed:19468300, PubMed:19468302). Promotes the central spindle recruitment of ECT2 (PubMed:16247472). Plays a central role in G2/M transition of mitotic cell cycle by phosphorylating CCNB1, CDC25C, FOXM1, CENPU, PKMYT1/MYT1, PPP1R12A/MYPT1 and WEE1 (PubMed:11202906, PubMed:12447691, PubMed:12524548, PubMed:19160488). Part of a regulatory circuit that promotes the activation of CDK1 by phosphorylating the positive regulator CDC25C and inhibiting the negative regulators WEE1 and PKMYT1/MYT1 (PubMed:11202906). Also acts by mediating phosphorylation of cyclin-B1 (CCNB1) on centrosomes in prophase (PubMed:12447691, PubMed:12524548). Phosphorylates FOXM1, a key mitotic transcription regulator, leading to enhance FOXM1 transcriptional activity (PubMed:19160488). Involved in kinetochore functions and sister chromatid cohesion by phosphorylating BUB1B/BUBR1, FBXO5/EMI1 and STAG2/SA2 (PubMed:15148369, PubMed:15469984, PubMed:17376779, PubMed:18331714). PLK1 is high on non-attached kinetochores suggesting a role of PLK1 in kinetochore attachment or in spindle assembly checkpoint (SAC) regulation (PubMed:17617734). Required for kinetochore localization of BUB1B (PubMed:17376779). Regulates the dissociation of cohesin from chromosomes by phosphorylating cohesin subunits such as STAG2/SA2 (By similarity). Phosphorylates SGO1: required for spindle pole localization of isoform 3 of SGO1 and plays a role in regulating its centriole cohesion function (PubMed:18331714). Mediates phosphorylation of FBXO5/EMI1, a negative regulator of the APC/C complex during prophase, leading to FBXO5/EMI1 ubiquitination and degradation by the proteasome (PubMed:15148369, PubMed:15469984). Acts as a negative regulator of p53 family members: phosphorylates TOPORS, leading to inhibit the sumoylation of p53/TP53 and simultaneously enhance the ubiquitination and subsequent degradation of p53/TP53 (PubMed:19473992). Phosphorylates the transactivation domain of the transcription factor p73/TP73, leading to inhibit p73/TP73-mediated transcriptional activation and pro-apoptotic functions. Phosphorylates BORA, and thereby promotes the degradation of BORA (PubMed:18521620). Contributes to the regulation of AURKA function (PubMed:18615013, PubMed:18662541). Also required for recovery after DNA damage checkpoint and entry into mitosis (PubMed:18615013, PubMed:18662541). Phosphorylates MISP, leading to stabilization of cortical and astral microtubule attachments required for proper spindle positioning (PubMed:23509069). Together with MEIKIN, acts as a regulator of kinetochore function during meiosis I: required both for mono- orientation of kinetochores on sister chromosomes and protection of centromeric cohesin from separase-mediated cleavage (By similarity). Phosphorylates CEP68 and is required for its degradation (PubMed:25503564). Regulates nuclear envelope breakdown during prophase by phosphorylating DCTN1 resulting in its localization in the nuclear envelope (PubMed:20679239). Phosphorylates the heat shock transcription factor HSF1, promoting HSF1 nuclear translocation upon heat shock (PubMed:15661742). Phosphorylates HSF1 also in the early mitotic period; this phosphorylation regulates HSF1 localization to the spindle pole, the recruitment of the SCF(BTRC) ubiquitin ligase complex induicing HSF1 degradation, and hence mitotic progression (PubMed:18794143). Regulates mitotic progression by phosphorylating RIOK2 (PubMed:21880710). Through the phosphorylation of DZIP1 regulates the localization during mitosis of the BBSome, a ciliary protein complex involved in cilium biogenesis (PubMed:27979967). Regulates DNA repair during mitosis by mediating phosphorylation of POLQ and RHNO1, thereby promoting POLQ recruitment to DNA damage sites (PubMed:37440612, PubMed:37674080). Phosphorylates ATXN10 which may play a role in the regulation of cytokinesis and may stimulate the proteasome-mediated degradation of ATXN10 (PubMed:21857149).

Cellular Location	Nucleus. Chromosome, centromere, kinetochore. Cytoplasm, cytoskeleton, microtubule organizing center, centrosome. Cytoplasm, cytoskeleton, spindle. Midbody. Note=localization at the centrosome starts at the G1/S transition (PubMed:24018379). During early stages of mitosis, the phosphorylated form is detected on centrosomes and kinetochores. Localizes to the outer kinetochore. Presence of SGO1 and interaction with the phosphorylated form of BUB1 is required for the kinetochore localization. Localizes onto the central spindle by phosphorylating and docking at midzone proteins KIF20A/MKLP2 and PRC1 Colocalizes with FRY to separating centrosomes and spindle poles from prophase to metaphase in mitosis, but not in other stages of the cell cycle. Localization to the centrosome is required for S phase progression (PubMed:24018379). Colocalizes with HSF1 at the spindle poles during prometaphase (PubMed:18794143)
Tissue Location	Placenta and colon.

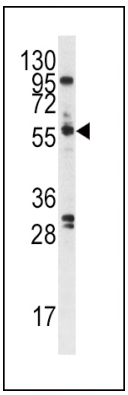
Background

Protein kinases are enzymes that transfer a phosphate group from a phosphate donor, generally the g phosphate of ATP, onto an acceptor amino acid in a substrate protein. By this basic mechanism, protein kinases mediate most of the signal transduction in eukaryotic cells, regulating cellular metabolism, transcription, cell cycle progression, cytoskeletal rearrangement and cell movement, apoptosis, and differentiation. With more than 500 gene products, the protein kinase family is one of the largest families of proteins in eukaryotes. The family has been classified in 8 major groups based on sequence comparison of their tyrosine (PTK) or serine/threonine (STK) kinase catalytic domains.

References

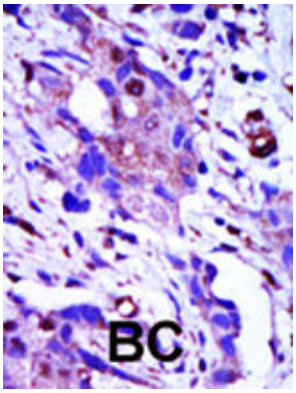
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Elia, A.E., et al., Cell 115(1):83-95 (2003).
Lin, H.R., et al., J. Biol. Chem. 278(38):35979-35987 (2003).
Neef, R., et al., J. Cell Biol. 162(5):863-875 (2003).

Images



Western blot analysis of anti-PLK Pab (Cat. #AP7937a) in A375 cell lysate. PLK (arrow) was detected using purified Pab. Secondary HRP-anti-rabbit was used for signal visualization with chemiluminescence.

Formalin-fixed and paraffin-embedded human cancer tissue reacted with the primary antibody, which was peroxidase-conjugated to the secondary antibody, followed by AEC staining. This data demonstrates the use of this antibody for immunohistochemistry; clinical relevance has not been evaluated. BC = breast carcinoma; HC = hepatocarcinoma.



Citations

- Polo-like kinase 1 is required for localization of Posterior End Mark protein to the centrosome-attracting body and unequal cleavages in ascidian embryos.
- Reduced miR-100 expression in cervical cancer and precursors and its carcinogenic effect through targeting PLK1 protein.

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