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PAK1 Antibody (T423)

Affinity Purified Rabbit Polyclonal Antibody (Pab)
Catalog # AP7926d

Product Information

Application	WB, IF, IHC-P, E
Primary Accession	Q13153
Other Accession	Q62829, Q61036, O75914, Q64303, Q29502, Q8CIN4, Q13177, P35465, O88643, Q08E52
Reactivity	Human
Predicted	Bovine, Mouse, Rat, Rabbit, Canine, Chicken
Host	Rabbit
Clonality	Polyclonal
Isotype	Rabbit IgG
Clone Names	RB11382
Calculated MW	60647
Antigen Region	401-430

Additional Information

Gene ID	5058
Other Names	Serine/threonine-protein kinase PAK 1, Alpha-PAK, p21-activated kinase 1, PAK-1, p65-PAK, PAK1
Target/Specificity	This PAK1 antibody is generated from rabbits immunized with a KLH conjugated synthetic peptide between 401-430 amino acids from human PAK1.
Dilution	WB~~1:1000 IF~~1:10~50 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 purified through a protein A column, followed by peptide affinity purification.
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	PAK1 Antibody (T423) is for research use only and not for use in diagnostic or therapeutic procedures.

Protein Information

Name	PAK1 {ECO:0000303|PubMed:8805275, ECO:0000312|HGNC:HGNC:8590}

Function

Protein kinase involved in intracellular signaling pathways downstream of integrins and receptor-type kinases that plays an important role in cytoskeleton dynamics, in cell adhesion, migration, proliferation, apoptosis, mitosis, and in vesicle-mediated transport processes (PubMed:10551809, PubMed:11896197, PubMed:12876277, PubMed:14585966, PubMed:15611088, PubMed:17726028, PubMed:17989089, PubMed:30290153, PubMed:17420447). Can directly phosphorylate BAD and protects cells against apoptosis (By similarity). Activated by interaction with CDC42 and RAC1 (PubMed:8805275, PubMed:9528787). Functions as a GTPase effector that links the Rho-related GTPases CDC42 and RAC1 to the JNK MAP kinase pathway (PubMed:8805275, PubMed:9528787). Phosphorylates and activates MAP2K1, and thereby mediates activation of downstream MAP kinases (By similarity). Involved in the reorganization of the actin cytoskeleton, actin stress fibers and of focal adhesion complexes (PubMed:9032240, PubMed:9395435). Phosphorylates the tubulin chaperone TBCB and thereby plays a role in the regulation of microtubule biogenesis and organization of the tubulin cytoskeleton (PubMed:15831477). Plays a role in the regulation of insulin secretion in response to elevated glucose levels (PubMed:22669945). Part of a ternary complex that contains PAK1, DVL1 and MUSK that is important for MUSK-dependent regulation of AChR clustering during the formation of the neuromuscular junction (NMJ) (By similarity). Activity is inhibited in cells undergoing apoptosis, potentially due to binding of CDC2L1 and CDC2L2 (PubMed:12624090). Phosphorylates MYL9/MLC2 (By similarity). Phosphorylates RAF1 at 'Ser- 338' and 'Ser-339' resulting in: activation of RAF1, stimulation of RAF1 translocation to mitochondria, phosphorylation of BAD by RAF1, and RAF1 binding to BCL2 (PubMed:11733498). Phosphorylates SNAI1 at 'Ser- 246' promoting its transcriptional repressor activity by increasing its accumulation in the nucleus (PubMed:15833848). In podocytes, promotes NR3C2 nuclear localization (By similarity). Required for atypical chemokine receptor ACKR2-induced phosphorylation of LIMK1 and cofilin (CFL1) and for the up-regulation of ACKR2 from endosomal compartment to cell membrane, increasing its efficiency in chemokine uptake and degradation (PubMed:23633677). In synapses, seems to mediate the regulation of F-actin cluster formation performed by SHANK3, maybe through CFL1 phosphorylation and inactivation (By similarity). Plays a role in RUFY3-mediated facilitating gastric cancer cells migration and invasion (PubMed:25766321). In response to DNA damage, phosphorylates MORC2 which activates its ATPase activity and facilitates chromatin remodeling (PubMed:23260667). In neurons, plays a crucial role in regulating GABA(A) receptor synaptic stability and hence GABAergic inhibitory synaptic transmission through its role in F-actin stabilization (By similarity). In hippocampal neurons, necessary for the formation of dendritic spines and excitatory synapses; this function is dependent on kinase activity and may be exerted by the regulation of actomyosin contractility through the phosphorylation of myosin II regulatory light chain (MLC) (By similarity). Along with GIT1, positively regulates microtubule nucleation during interphase (PubMed:27012601). Phosphorylates FXR1, promoting its localization to stress granules and activity (PubMed:20417602). Phosphorylates ILK on 'Thr-173' and 'Ser-246', promoting nuclear export of ILK (PubMed:17420447).

Cellular Location

Cytoplasm. Cell junction, focal adhesion. Cell projection, lamellipodium. Cell membrane. Cell projection, ruffle membrane. Cell projection, invadopodium. Nucleus, nucleoplasm. Chromosome. Cytoplasm, cytoskeleton, microtubule organizing center, centrosome Note=Colocalizes with RUFY3, F-actin and other core migration components in invadopodia at the cell periphery (PubMed:25766321) Recruited to the cell membrane by interaction with CDC42 and RAC1 Recruited to focal adhesions upon activation. Colocalized with CIB1 within membrane ruffles during cell spreading upon readhesion to fibronectin. Upon DNA damage, translocates to the nucleoplasm when phosphorylated at Thr-212 where is co-recruited with MORC2 on damaged

chromatin (PubMed:23260667). Localization to the centrosome does not depend upon the presence of gamma-tubulin (PubMed:27012601) Localization of the active, but not inactive, protein to the adhesions and edge of lamellipodia is mediated by interaction with GIT1 (PubMed:11896197). {ECO:0000250|UniProtKB:P35465, ECO:0000269|PubMed:11896197, ECO:0000269|PubMed:23260667, ECO:0000269|PubMed:25766321, ECO:0000269|PubMed:27012601}

Tissue Location Overexpressed in gastric cancer cells and tissues (at protein level) (PubMed:25766321).

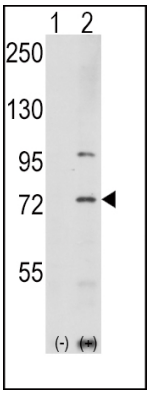
Background

PAK1, a member of the STE20 subfamily of Ser/Thr protein kinases, acts on a variety of targets. It is likely to be the GTPase effector that links the Rho-related GTPases to the JNK MAP kinase pathway. Activity is inhibited in cells undergoing apoptosis, potentially due to binding of CDC2L1 and CDC2L2. The protein interacts tightly with GTP-bound but not GDP-bound CDC42/P21 and RAC1. PAK1 binds to the caspase-cleaved p110 isoform of CDC2L1 and CDC2L2, p110C, but not the full-length proteins. It is a component of cytoplasmic complexes, which also contain PXN, ARHGEF6 and GIT1. The protein is autophosphorylated when activated by CDC42/p21. Structurally, the PAK1 contains 1 CRIB domain.

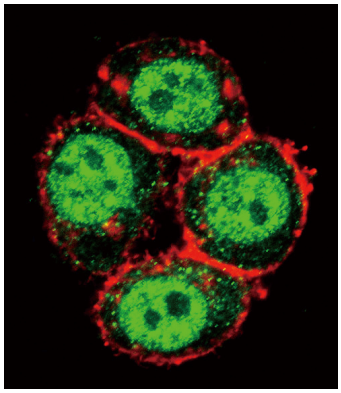
References

Chen, S., et al., J. Biol. Chem. 278(22):20029-20036 (2003).
Sells, M.A., et al., Curr. Biol. 7(3):202-210 (1997).
Brown, J.L., et al., Curr. Biol. 6(5):598-605 (1996).

Images

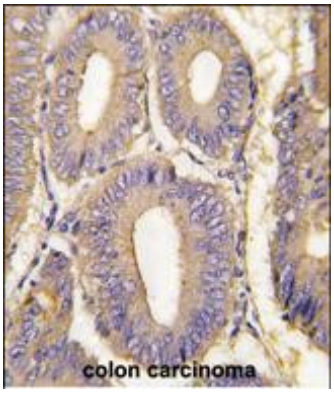


Western blot analysis of PAK1 (arrow) using rabbit polyclonal PAK1 Antibody (T423) (Cat.#AP7926d).293 cell lysates (2 ug/lane) either nontransfected (Lane 1) or transiently transfected with the PAK1 gene (Lane 2) (Origene Technologies).



Confocal immunofluorescent analysis of PAK1 Antibody (T423)(Cat#AP7926d) with Hela cell followed by Alexa Fluor 488-conjugated goat anti-rabbit lgG (green). Actin filaments have been labeled with Alexa Fluor 555 phalloidin (red).

Formalin-fixed and paraffin-embedded human colon



carcinoma tissue reacted with PAK1 Antibody (T423) (Cat.#AP7926d), which was peroxidase-conjugated to the secondary antibody, followed by DAB staining. This data demonstrates the use of this antibody for immunohistochemistry; clinical relevance has not been evaluated.

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