

Bi-Phospho-GSK3B(S21/29) Antibody

Affinity Purified Rabbit Polyclonal Antibody (Pab)

Catalog # AP3111a

Product Information

Application	WB, IHC-P, E
Primary Accession	P49841
Reactivity	Human, Mouse
Host	Rabbit
Clonality	Polyclonal
Isotype	Rabbit IgG
Clone Names	RB2672
Calculated MW	46744

Additional Information

Gene ID	2932
Other Names	Glycogen synthase kinase-3 beta, GSK-3 beta, Serine/threonine-protein kinase GSK3B, GSK3B
Target/Specificity	This GSK3B Antibody is generated from rabbits immunized with a KLH conjugated synthetic phosphopeptide corresponding to amino acid residues surrounding S21/29 of human GSK3B.
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 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	Bi-Phospho-GSK3B(S21/29) Antibody is for research use only and not for use in diagnostic or therapeutic procedures.

Protein Information

Name	GSK3B (HGNC:4617)
Function	Constitutively active protein kinase that acts as a negative regulator in the hormonal control of glucose homeostasis, Wnt signaling and regulation of transcription factors and microtubules, by phosphorylating and inactivating glycogen synthase (GYS1 or GYS2), EIF2B, CTNNB1/beta-catenin, APC, AXIN1, DPYSL2/CRMP2, JUN, NFATC1/NFATC, MAPT/TAU and MACF1

(PubMed:[11430833](#), PubMed:[12554650](#), PubMed:[14690523](#), PubMed:[16484495](#), PubMed:[1846781](#), PubMed:[20937854](#), PubMed:[9072970](#)). Requires primed phosphorylation of the majority of its substrates (PubMed:[11430833](#), PubMed:[16484495](#)). In skeletal muscle, contributes to insulin regulation of glycogen synthesis by phosphorylating and inhibiting GYS1 activity and hence glycogen synthesis (PubMed:[8397507](#)). May also mediate the development of insulin resistance by regulating activation of transcription factors (PubMed:[8397507](#)). Regulates protein synthesis by controlling the activity of initiation factor 2B (EIF2BE/EIF2B5) in the same manner as glycogen synthase (PubMed:[8397507](#)). In Wnt signaling, GSK3B forms a multimeric complex with APC, AXIN1 and CTNNB1/beta-catenin and phosphorylates the N-terminus of CTNNB1 leading to its degradation mediated by ubiquitin/proteasomes (PubMed:[12554650](#)). Phosphorylates JUN at sites proximal to its DNA-binding domain, thereby reducing its affinity for DNA (PubMed:[1846781](#)). Phosphorylates NFATC1/NFATC on conserved serine residues promoting NFATC1/NFATC nuclear export, shutting off NFATC1/NFATC gene regulation, and thereby opposing the action of calcineurin (PubMed:[9072970](#)). Phosphorylates MAPT/TAU on 'Thr-548', decreasing significantly MAPT/TAU ability to bind and stabilize microtubules (PubMed:[14690523](#)). MAPT/TAU is the principal component of neurofibrillary tangles in Alzheimer disease (PubMed:[14690523](#)). Plays an important role in ERBB2-dependent stabilization of microtubules at the cell cortex (PubMed:[20937854](#)). Phosphorylates MACF1, inhibiting its binding to microtubules which is critical for its role in bulge stem cell migration and skin wound repair (By similarity). Probably regulates NF-kappa-B (NFKB1) at the transcriptional level and is required for the NF-kappa-B-mediated anti-apoptotic response to TNF (TNF/TNFA) (By similarity). Negatively regulates replication in pancreatic beta-cells, resulting in apoptosis, loss of beta-cells and diabetes (By similarity). Through phosphorylation of the anti-apoptotic protein MCL1, may control cell apoptosis in response to growth factors deprivation (By similarity). Phosphorylates MUC1 in breast cancer cells, decreasing the interaction of MUC1 with CTNNB1/beta-catenin (PubMed:[9819408](#)). Is necessary for the establishment of neuronal polarity and axon outgrowth (PubMed:[20067585](#)). Phosphorylates MARK2, leading to inhibition of its activity (By similarity). Phosphorylates SIK1 at 'Thr-182', leading to sustainment of its activity (PubMed:[18348280](#)). Phosphorylates ZC3HAV1 which enhances its antiviral activity (PubMed:[22514281](#)). Phosphorylates SNAI1, leading to its ubiquitination and proteasomal degradation (PubMed:[15448698](#), PubMed:[15647282](#), PubMed:[25827072](#), PubMed:[29059170](#)). Phosphorylates SFPQ at 'Thr-687' upon T-cell activation (PubMed:[20932480](#)). Phosphorylates NR1D1 at 'Ser-55' and 'Ser-59' and stabilizes it by protecting it from proteasomal degradation. Regulates the circadian clock via phosphorylation of the major clock components including BMAL1, CLOCK and PER2 (PubMed:[19946213](#), PubMed:[28903391](#)). Phosphorylates FBXL2 at 'Thr-404' and primes it for ubiquitination by the SCF(FBXO3) complex and proteasomal degradation (By similarity). Phosphorylates CLOCK AT 'Ser-427' and targets it for proteasomal degradation (PubMed:[19946213](#)). Phosphorylates BMAL1 at 'Ser-17' and 'Ser-21' and primes it for ubiquitination and proteasomal degradation (PubMed:[28903391](#)). Phosphorylates OGT at 'Ser-3' or 'Ser-4' which positively regulates its activity. Phosphorylates MYCN in neuroblastoma cells which may promote its degradation (PubMed:[24391509](#)). Regulates the circadian rhythmicity of hippocampal long-term potentiation and BMAL1 and PER2 expression (By similarity). Acts as a regulator of autophagy by mediating phosphorylation of KAT5/TIP60 under starvation conditions, activating KAT5/TIP60 acetyltransferase activity and promoting acetylation of key autophagy regulators, such as ULK1 and RUBCNL/Pacer (PubMed:[30704899](#)). Negatively regulates extrinsic apoptotic signaling pathway via death domain receptors. Promotes the formation of an anti-apoptotic complex, made of DDX3X, BRIC2 and GSK3B, at death receptors, including TNFRSF10B. The

anti-apoptotic function is most effective with weak apoptotic signals and can be overcome by stronger stimulation (PubMed:[18846110](#)). Phosphorylates E2F1, promoting the interaction between E2F1 and USP11, stabilizing E2F1 and promoting its activity (PubMed:[17050006](#), PubMed:[28992046](#)). Phosphorylates mTORC2 complex component RICTOR at 'Ser-1235' in response to endoplasmic stress, inhibiting mTORC2 (PubMed:[21343617](#)). Phosphorylates mTORC2 complex component RICTOR at 'Thr-1695' which facilitates FBXW7-mediated ubiquitination and subsequent degradation of RICTOR (PubMed:[25897075](#)). Phosphorylates FXR1, promoting FXR1 ubiquitination by the SCF(FBXO4) complex and FXR1 degradation by the proteasome (By similarity). Phosphorylates interleukin-22 receptor subunit IL22RA1, preventing its proteasomal degradation (By similarity). Phosphorylates and inhibits the CTP synthase and protein-asparagine deamidase activities of CTPS1 (PubMed:[17681942](#)). Phosphorylates DSP at multiple sequential serine residues in the C-terminus tail, promoting its recruitment to developing desmosome cell-cell junctions (PubMed:[25733715](#)).

Cellular Location

Cytoplasm. Nucleus. Cell membrane. Note=The phosphorylated form shows localization to cytoplasm and cell membrane (PubMed:20937854). The MECOM1-RHOA-DIAPH1 signaling pathway controls localization of the phosphorylated form to the cell membrane (PubMed:20937854)

Tissue Location

Expressed in testis, thymus, prostate and ovary and weakly expressed in lung, brain and kidney. Colocalizes with EIF2AK2/PKR and TAU in the Alzheimer disease (AD) brain

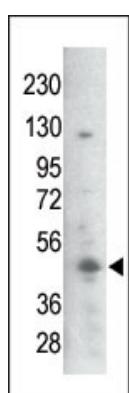
Background

Glycogen synthase kinase-3 (GSK3) is a proline-directed serine-threonine kinase that was initially identified as a phosphorylating and inactivating glycogen synthase. Two isoforms, alpha (GSK3A) and beta, show a high degree of amino acid homology. GSK3B is involved in energy metabolism, neuronal cell development, and body pattern formation.

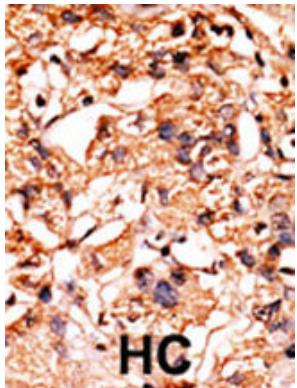
References

Wang, L., et al., J. Biol. Chem. 279(31):32444-32452 (2004).
Yuan, Z., et al., J. Biol. Chem. 279(25):26105-26114 (2004).
Liao, X., et al., Endocrinology 145(6):2941-2949 (2004).
Salas, T.R., et al., J. Biol. Chem. 279(18):19191-19200 (2004).
Takahashi-Yanaga, F., et al., Biochem. Biophys. Res. Commun. 316(2):411-415 (2004).

Images



The anti-Phospho-GSK3B-S21/29 Pab (Cat. #AP3111a) is used in Western blot to detect Phospho-GSK3B-S21/29 in mouse thymus tissue lysate.



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

- [Axl mediates tumor invasion and chemosensitivity through PI3K/Akt signaling pathway and is transcriptionally regulated by slug in breast carcinoma.](#)

Please note: All products are 'FOR RESEARCH USE ONLY. NOT FOR USE IN DIAGNOSTIC OR THERAPEUTIC PROCEDURES'.