

**GSK3B Antibody**  
**Purified Mouse Monoclonal Antibody**  
**Catalog # AO1359a****Specification**

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**GSK3B Antibody - Product Information**

Application	<b>WB, IHC, IF, FC</b>
Primary Accession	<a href="#">P49841</a>
Reactivity	<b>Human, Mouse, Rat, Monkey</b>
Host	<b>Mouse</b>
Clonality	<b>Monoclonal</b>
Isotype	<b>IgG2a</b>
Calculated MW	<b>46kDa KDa</b>

**Description**

Glycogen synthase kinase 3 (GSK-3), a serine-threonine kinase with two isoforms (alpha and beta), was originally discovered as a key enzyme in glycogen metabolism. GSK-3 was subsequently shown to function in cell division, proliferation, motility and survival. GSK-3 plays a role in a number of pathological conditions including cancer and diabetes and is increasingly seen as an important component of neurological diseases. GSK-3 phosphorylates tau and presenilin-1, which are involved in the development of Alzheimer's disease. Both isoforms of GSK-3 are ubiquitously expressed, although particularly high levels of GSK-3beta are found in the brain where it is involved in synaptic plasticity, possibly via regulation of NMDA receptor trafficking. GSK-3 phosphorylates over 40 different substrates including signaling proteins, transcription factors and structural proteins, and is part of the signal transduction cascade of a large number of growth factors and cytokines. The activity of GSK is regulated by phosphorylation (Akt: Akt-mediated phosphorylation at Ser21 of GSK-3 $\alpha$  and Ser9 of GSK-3 $\beta$ , S6K, RSK, PKA and PKC), dephosphorylation (PP1 and PP2A), and by binding to protein complexes (with beta-catenin, axin, CK1 and the APC complex).

**Immunogen**

Purified recombinant fragment of human GSK3B expressed in E. Coli.<br />

**Formulation**

Ascitic fluid containing 0.03% sodium azide.

**GSK3B Antibody - Additional Information**

**Gene ID** 2932

**Other Names**

Glycogen synthase kinase-3 beta, GSK-3 beta, 2.7.11.26, Serine/threonine-protein kinase GSK3B, 2.7.11.1, GSK3B

**Dilution**

WB~~1/500 - 1/2000  
IHC~~1/200 - 1/1000  
IF~~1/200 - 1/1000  
FC~~1/200 - 1/400

## Storage

Maintain refrigerated at 2-8°C for up to 6 months. For long term storage store at -20°C in small aliquots to prevent freeze-thaw cycles.

## Precautions

GSK3B Antibody is for research use only and not for use in diagnostic or therapeutic procedures.

## GSK3B Antibody - 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:<a href="http://www.uniprot.org/citations/11430833" target="\_blank">11430833</a>, PubMed:<a href="http://www.uniprot.org/citations/12554650" target="\_blank">12554650</a>, PubMed:<a href="http://www.uniprot.org/citations/14690523" target="\_blank">14690523</a>, PubMed:<a href="http://www.uniprot.org/citations/16484495" target="\_blank">16484495</a>, PubMed:<a href="http://www.uniprot.org/citations/1846781" target="\_blank">1846781</a>, PubMed:<a href="http://www.uniprot.org/citations/20937854" target="\_blank">20937854</a>, PubMed:<a href="http://www.uniprot.org/citations/9072970" target="\_blank">9072970</a>). Requires primed phosphorylation of the majority of its substrates (PubMed:<a href="http://www.uniprot.org/citations/11430833" target="\_blank">11430833</a>, PubMed:<a href="http://www.uniprot.org/citations/16484495" target="\_blank">16484495</a>). In skeletal muscle, contributes to insulin regulation of glycogen synthesis by phosphorylating and inhibiting GYS1 activity and hence glycogen synthesis (PubMed:<a href="http://www.uniprot.org/citations/8397507" target="\_blank">8397507</a>). May also mediate the development of insulin resistance by regulating activation of transcription factors (PubMed:<a href="http://www.uniprot.org/citations/8397507" target="\_blank">8397507</a>). Regulates protein synthesis by controlling the activity of initiation factor 2B (EIF2BE/EIF2B5) in the same manner as glycogen synthase (PubMed:<a href="http://www.uniprot.org/citations/8397507" target="\_blank">8397507</a>). 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:<a href="http://www.uniprot.org/citations/12554650" target="\_blank">12554650</a>). Phosphorylates JUN at sites proximal to its DNA-binding domain, thereby reducing its affinity for DNA (PubMed:<a href="http://www.uniprot.org/citations/1846781" target="\_blank">1846781</a>). 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:<a href="http://www.uniprot.org/citations/9072970" target="\_blank">9072970</a>). Phosphorylates MAPT/TAU on 'Thr-548', decreasing significantly MAPT/TAU ability to bind and stabilize microtubules (PubMed:<a href="http://www.uniprot.org/citations/14690523" target="\_blank">14690523</a>). MAPT/TAU is the principal component of neurofibrillary tangles in Alzheimer disease (PubMed:<a href="http://www.uniprot.org/citations/14690523" target="\_blank">14690523</a>). Plays an important role in ERBB2-dependent stabilization of microtubules at the cell cortex (PubMed:<a href="http://www.uniprot.org/citations/20937854" target="\_blank">20937854</a>). 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-alpha (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:<a href="http://www.uniprot.org/citations/9819408" target="\_blank">9819408</a>). Is necessary for the establishment of neuronal polarity and axon outgrowth (PubMed:<a href="http://www.uniprot.org/citations/20067585" target="\_blank">20067585</a>). Phosphorylates MARK2, leading to inhibition of its activity (By similarity). Phosphorylates SIK1 at 'Thr-182', leading to sustainment of its activity (PubMed:<a href="http://www.uniprot.org/citations/18348280" target="\_blank">18348280</a>). Phosphorylates ZC3HAV1 which enhances its antiviral activity (PubMed:<a href="http://www.uniprot.org/citations/22514281" target="\_blank">22514281</a>). Phosphorylates SNAI1, leading to its ubiquitination and proteasomal degradation (PubMed:<a href="http://www.uniprot.org/citations/15448698" target="\_blank">15448698</a>, PubMed:<a href="http://www.uniprot.org/citations/15647282" target="\_blank">15647282</a>, PubMed:<a href="http://www.uniprot.org/citations/25827072" target="\_blank">25827072</a>, PubMed:<a href="http://www.uniprot.org/citations/29059170" target="\_blank">29059170</a>). Phosphorylates SFPQ at 'Thr-687' upon T-cell activation (PubMed:<a href="http://www.uniprot.org/citations/20932480" target="\_blank">20932480</a>). 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:<a href="http://www.uniprot.org/citations/19946213" target="\_blank">19946213</a>, PubMed:<a href="http://www.uniprot.org/citations/28903391" target="\_blank">28903391</a>). 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:<a href="http://www.uniprot.org/citations/19946213" target="\_blank">19946213</a>). Phosphorylates BMAL1 at 'Ser-17' and 'Ser-21' and primes it for ubiquitination and proteasomal degradation (PubMed:<a href="http://www.uniprot.org/citations/28903391" target="\_blank">28903391</a>). Phosphorylates OGT at 'Ser-3' or 'Ser-4' which positively regulates its activity. Phosphorylates MYCN in neuroblastoma cells which may promote its degradation (PubMed:<a href="http://www.uniprot.org/citations/24391509" target="\_blank">24391509</a>). 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:<a href="http://www.uniprot.org/citations/30704899" target="\_blank">30704899</a>). 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:<a href="http://www.uniprot.org/citations/18846110" target="\_blank">18846110</a>). Phosphorylates E2F1, promoting the interaction between E2F1 and USP11, stabilizing E2F1 and promoting its activity (PubMed:<a href="http://www.uniprot.org/citations/17050006" target="\_blank">17050006</a>, PubMed:<a href="http://www.uniprot.org/citations/28992046" target="\_blank">28992046</a>). Phosphorylates mTORC2 complex component RICTOR at 'Ser-1235' in response to endoplasmic stress, inhibiting mTORC2 (PubMed:<a href="http://www.uniprot.org/citations/21343617" target="\_blank">21343617</a>). Phosphorylates mTORC2 complex component RICTOR at 'Thr-1695' which facilitates FBXW7-mediated ubiquitination and subsequent degradation of RICTOR (PubMed:<a href="http://www.uniprot.org/citations/25897075" target="\_blank">25897075</a>). 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).

### Cellular Location

Cytoplasm. Nucleus. Cell membrane. Note=The phosphorylated form shows localization to cytoplasm and cell membrane (PubMed:20937854) The MEMO1-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

### GSK3B Antibody - Protocols

Provided below are standard protocols that you may find useful for product applications.

- [Western Blot](#)
- [Blocking Peptides](#)
- [Dot Blot](#)
- [Immunohistochemistry](#)
- [Immunofluorescence](#)
- [Immunoprecipitation](#)
- [Flow Cytometry](#)
- [Cell Culture](#)

### GSK3B Antibody - Images

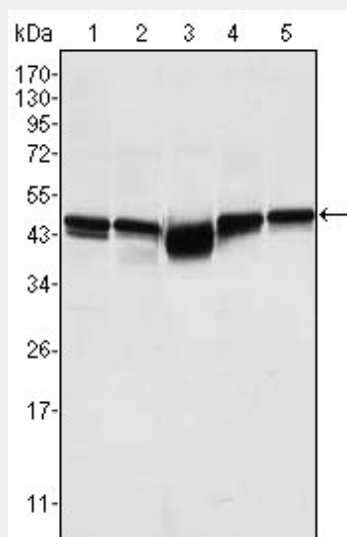


Figure 1: Western blot analysis using GSK3B mouse mAb against A549 (1), K562 (2), PC-12 (3), NIH/3T3 (4), and HEK293 (5) cell lysate.

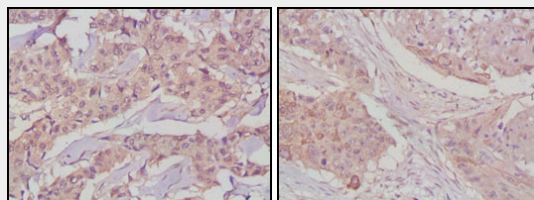


Figure 2: Immunohistochemical analysis of paraffin-embedded human lung cancer (left) and breast cancer tissues (right) using GSK3B mouse mAb with DAB staining.

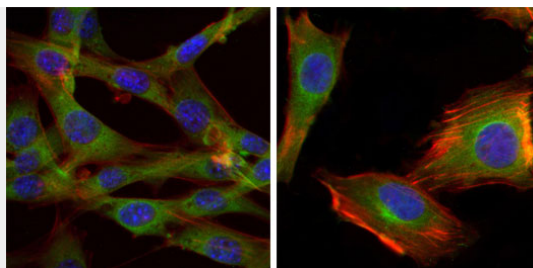


Figure 3: Immunofluorescence analysis of NIH/3T3 (left) and U251 (right) cells using GSK3B mouse mAb (green). Blue: DRAQ5 fluorescent DNA dye. Red: Actin filaments have been labeled with Alexa Fluor-555 phalloidin.

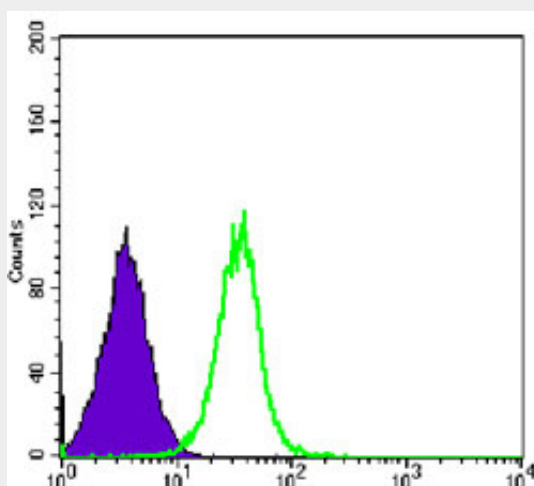


Figure 4: Flow cytometric analysis of HeLa cells using GSK3B mouse mAb (green) and negative control (purple).

#### **GSK3B Antibody - References**

1. EMBO J. 1998 Mar 2;17(5):1371-84.
2. Curr Biol. 2001 Jan 9;11(1):44-9.
3. Cancer Lett. 2003 Sep 25;199(2):201-8.