

**Phospho-GSK3(S21) Antibody Blocking peptide**  
**Synthetic peptide**  
**Catalog # BP3521a****Specification**

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**Phospho-GSK3(S21) Antibody Blocking peptide - Product Information**Primary Accession [P49841](#)**Phospho-GSK3(S21) Antibody Blocking peptide - Additional Information****Gene ID** 2932**Other Names**

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

**Target/Specificity**

The synthetic peptide sequence used to generate the antibody [AP3521a](/product/products/AP3521a) was selected from the region of human Phospho-GSK3-S21. A 10 to 100 fold molar excess to antibody is recommended. Precise conditions should be optimized for a particular assay.

**Format**

Peptides are lyophilized in a solid powder format. Peptides can be reconstituted in solution using the appropriate buffer as needed.

**Storage**

Maintain refrigerated at 2-8°C for up to 6 months. For long term storage store at -20°C.

**Precautions**

This product is for research use only. Not for use in diagnostic or therapeutic procedures.

**Phospho-GSK3(S21) Antibody Blocking peptide - 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: [1846781](http://www.uniprot.org/citations/1846781), PubMed: [9072970](http://www.uniprot.org/citations/9072970), PubMed: [14690523](http://www.uniprot.org/citations/14690523), PubMed: [20937854](http://www.uniprot.org/citations/20937854), PubMed: [12554650](http://www.uniprot.org/citations/12554650), PubMed: [11430833](http://www.uniprot.org/citations/11430833), PubMed: [16484495](http://www.uniprot.org/citations/16484495)). Requires primed phosphorylation of the majority of its substrates (PubMed: [16484495](#)).

[11430833](http://www.uniprot.org/citations/11430833), PubMed: [16484495](http://www.uniprot.org/citations/16484495)). In skeletal muscle, contributes to insulin regulation of glycogen synthesis by phosphorylating and inhibiting GYS1 activity and hence glycogen synthesis (PubMed: [8397507](http://www.uniprot.org/citations/8397507)). May also mediate the development of insulin resistance by regulating activation of transcription factors (PubMed: [8397507](http://www.uniprot.org/citations/8397507)). Regulates protein synthesis by controlling the activity of initiation factor 2B (EIF2BE/EIF2B5) in the same manner as glycogen synthase (PubMed: [8397507](http://www.uniprot.org/citations/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](http://www.uniprot.org/citations/12554650)). Phosphorylates JUN at sites proximal to its DNA-binding domain, thereby reducing its affinity for DNA (PubMed: [1846781](http://www.uniprot.org/citations/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](http://www.uniprot.org/citations/9072970)). Phosphorylates MAPT/TAU on 'Thr-548', decreasing significantly MAPT/TAU ability to bind and stabilize microtubules (PubMed: [14690523](http://www.uniprot.org/citations/14690523)). MAPT/TAU is the principal component of neurofibrillary tangles in Alzheimer disease (PubMed: [14690523](http://www.uniprot.org/citations/14690523)). Plays an important role in ERBB2-dependent stabilization of microtubules at the cell cortex (PubMed: [20937854](http://www.uniprot.org/citations/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-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: [9819408](http://www.uniprot.org/citations/9819408)). Is necessary for the establishment of neuronal polarity and axon outgrowth (PubMed: [20067585](http://www.uniprot.org/citations/20067585)). Phosphorylates MARK2, leading to inhibition of its activity (By similarity). Phosphorylates SIK1 at 'Thr-182', leading to sustainment of its activity (PubMed: [18348280](http://www.uniprot.org/citations/18348280)). Phosphorylates ZC3HAV1 which enhances its antiviral activity (PubMed: [22514281](http://www.uniprot.org/citations/22514281)). Phosphorylates SNAI1, leading to its BTRC-triggered ubiquitination and proteasomal degradation (PubMed: [15448698](http://www.uniprot.org/citations/15448698), PubMed: [15647282](http://www.uniprot.org/citations/15647282)). Phosphorylates SFPQ at 'Thr-687' upon T-cell activation (PubMed: [20932480](http://www.uniprot.org/citations/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](http://www.uniprot.org/citations/19946213), PubMed: [28903391](http://www.uniprot.org/citations/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](http://www.uniprot.org/citations/19946213)). Phosphorylates BMAL1 at 'Ser-17' and 'Ser-21' and primes it for ubiquitination and proteasomal degradation (PubMed: [28903391](http://www.uniprot.org/citations/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:<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 '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

### **Phospho-GSK3(S21) Antibody Blocking peptide - Protocols**

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

- [Blocking Peptides](#)

### **Phospho-GSK3(S21) Antibody Blocking peptide - Images**

### **Phospho-GSK3(S21) Antibody Blocking peptide - 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; MIM 606784) and beta, show a high degree of amino acid homology (Stambolic and Woodgett, 1994 [PubMed 7980435]). GSK3B is involved in energy metabolism, neuronal cell development, and body pattern formation (Plyte et al., 1992 [PubMed 1333807]). [supplied by OMIM].

### **Phospho-GSK3(S21) Antibody Blocking peptide - References**

Izumi, N., J. Biol. Chem. 283 (19), 12981-12991 (2008) Deng, H., J. Biol. Chem. 283 (15), 10198-10207 (2008) Ma, C., J. Biol. Chem. 283 (14), 9248-9256 (2008)