# GSK-3 α Antibody

Cat. No. CP10118

| | |
|---|---|
| **Applications:** | **WB** |
| **Detected MW:** | **51 kDa** |
| **Species & Reactivity:** | **Human** |
| **Isotype:** | **Mouse IgG1** |

## BACKGROUND

Glycogen synthase kinase 3 (GSK-3), a ubiquitously expressed and evolutionarily conserved protein serine/threonine kinase, was originally identified as an enzyme that regulates glycogen synthesis in response to insulin. 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.[1]

There are two mammalian GSK-3 isoforms encoded by distinct genes: GSK-3alpha and GSK-3beta. They are closely related in function. GSK-3alpha has a mass of 51 kDa, whereas GSK-3beta is a protein of 47 kDa. The difference in size is due to a glycine-rich extension at the N-terminus of GSK-3alpha. Although highly homologous within their kinase domains (98% identity), the two gene products share only 36% identity in the last 76 C-terminal residues. Moreover, they are not functionally identical. 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. GSK-3 has also been implicated in the regulation of cell fate in *Dictyostelium* and is a component of the Wnt signaling pathway required for *Drosophila* and *Xenopus* development.[2]

The activity of GSK is regulated by phosphorylation (Akt, S6K, RSK, PKA and PKC), dephosphorylation (PP1 and PP2A), and by binding to protein complexes (with beta-catenin, axin, CK1 and the APC complex). In mammalian cells, on stimulation with insulin or other growth factors, GSK-3 is rapidly phosphorylated at serine 21 in GSK-3alpha or serine 9 in GSK-3beta, resulting in inhibition of GSK-3 kinase activity. Protein kinase B (PKB/Akt), a serine/threonine kinase located downstream of phosphatidylinositol 3-kinase (PI3K), has been demonstrated to phosphorylate both of these sites *in vitro* and *in vivo*, suggesting that growth factors down-regulate GSK-3 activity through the PI3K–PKB signaling cascade . Consistent with its position downstream of the PI3K–PKB pathway, GSK-3 activity suppresses cell proliferation and survival.[3] It was also demonstrated that serine 21 in GSK-3alpha and serine 9 in GSK-3beta are also physiological substrates of cAMP-dependent protein kinase A (PKA). PKA physically associates with, phosphorylates, and inactivates both isoforms of GSK-3. Thus PKA functions as a GSK-3 kinase that, in parallel with PKB, controls the activity of the multifunctional enzyme GSK-3.[4]

**References**:
1. Ali, A. et al: *Chem. Rev. 101:2527*–40, 2001
2. Doble, B.W. & Woodgett, J.R.: J. Cell Sci. 116:1175-86, 2003
3. Elder-Finkelman, H. et al: Trends Mol. Med. 8:126-32, 2002
4. Fang, X. et al: Proc. Natl. Acad. Sci. USA 97:11960-5, 2000

## TECHNICAL INFORMATION

**Source:**
GSK-3 alpha antibody is a mouse monoclonal antibody raised against purified recombinant human GSK-3 alpha fragments expressed in *E. coli*.

**Specificity and Sensitivity:**
This antibody detects endogenous GSK-3 alpha proteins without cross-reactivity with other family members.

**Storage Buffer**: PBS and 30% glycerol

**Storage**:
Store at -20°C for at least one year. Store at 4°C for frequent use. Avoid repeated freeze-thaw cycles.

## APPLICATIONS

| Application: | *Dilution: |
|---|---|
| WB | 1:1000 |
| IP | n/d |
| IHC | n/d |
| ICC | n/d |
| FACS | n/d |

**Optimal dilutions must be determined by end user.*

CELL APPLICATIONS, INC.

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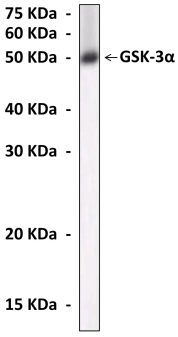
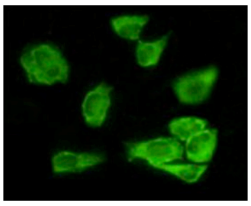
## QUALITY CONTROL DATA



**Top:** Western Blot detection of GSK-3 alpha proteins in HeLa cell lysate using GSK-3 alpha Antibody. **Bottom: I**mmunofluorescent analysis of HeLa using GSK-3alpha Antibody.