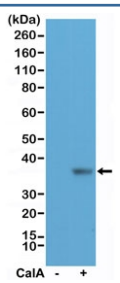
Phospho-EIF2 alpha (pS51) Antibody / Translation Stress Signaling Marker [clone RM298] (R20320)

Catalog No.	Formulation	Size
R20320-0.1ML	Antibody in PBS with 50% glycerol, 1% BSA and 0.09% sodium azide	100 ul

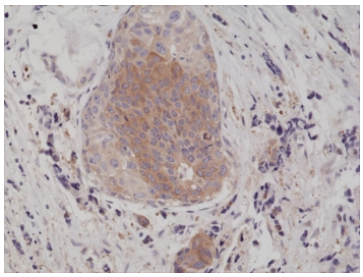
Recombinant RABBIT MONOCLONAL

Bulk quote request

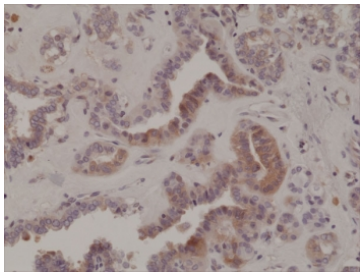
Availability	1-3 business days
Species Reactivity	Human
Predicted Reactivity	Mouse, Rat
Format	Purified
Host	Rabbit
Clonality	Recombinant Rabbit Monoclonal
Isotype	Rabbit IgG
Clone Name	RM298
Purity	Protein A purified from animal origin-free supernatant
UniProt	P05198
Localization	Cytoplasmic
Applications	Immunohistochemistry (FFPE) : 1:100-1:200 Western Blot : 1:100-1:200
Limitations	This Phospho-EIF2 alpha (pS51) Antibody / Translation Stress Signaling Marker is available for research use only.



Phospho-EIF2 alpha Antibody HeLa WB. Western blot analysis of human HeLa cell lysates untreated (-) or treated (+) with Calyculin A (CalA) using phospho-EIF2 alpha antibody detecting EIF2 alpha phosphorylated at Ser51, clone RM298. A band is observed at approximately 36 kDa, consistent with the predicted molecular weight of EIF2 alpha. Signal intensity is increased in the CalA-treated sample, indicating enhanced phosphorylation and activation of stress-associated translation control pathways.



IHC testing of formalin fixed and paraffin embedded human breast cancer tissue with Phospho-EIF2 alpha (pS51) Antibody at 1:200 dilution. HIER: steam section in pH6 citrate buffer for 20 min and allow to cool prior to staining.



IHC testing of formalin fixed and paraffin embedded human thyroid cancer tissue with Phospho-EIF2 alpha (pS51) Antibody at 1:200 dilution. HIER: steam section in pH6 citrate buffer for 20 min and allow to cool prior to staining.

Description

Eukaryotic initiation factor 2 alpha (EIF2 alpha), encoded by the EIF2S1 gene, is a central regulator of translation initiation and a key mediator of cellular stress responses. Phospho-EIF2 alpha Antibody, clone RM298, is designed to detect EIF2 alpha phosphorylated at serine 51 (pS51), a critical regulatory site that controls global protein synthesis and activation of stress response pathways.

Phosphorylation of EIF2 alpha at Ser51 represents a pivotal switch in translational control. Under normal conditions, EIF2 alpha functions as part of the heterotrimeric eIF2 complex, delivering initiator methionyl-tRNA to the ribosome during early stages of protein synthesis. However, when Ser51 is phosphorylated, this process is inhibited, leading to a rapid reduction in global protein translation. This allows cells to conserve energy and resources while selectively translating stress-response genes that promote survival and adaptation.

The phosphorylation of EIF2 alpha is mediated by a family of stress-responsive kinases, including PERK, PKR, GCN2, and HRI. Each kinase is activated by distinct stimuli such as endoplasmic reticulum stress, viral infection, oxidative stress, or amino acid deprivation. Through these pathways, EIF2 alpha serves as a convergence point for multiple signaling networks, coordinating the integrated stress response and enabling cells to adapt to adverse conditions.

Unlike total EIF2 alpha detection, which reflects overall protein levels, phospho-specific detection at Ser51 provides direct insight into pathway activation and translational repression. Increased phosphorylation at this site is commonly observed following treatment with stress-inducing agents or phosphatase inhibitors such as Calyculin A, which enhance accumulation of the phosphorylated form. As a result, phospho-EIF2 alpha is widely used as a sensitive marker of cellular stress signaling and translational shutdown.

Subcellularly, phosphorylated EIF2 alpha is predominantly localized in the cytoplasm, where it associates with ribosomes and translation initiation complexes. Under stress conditions, it is also linked to the formation of stress granules and other ribonucleoprotein assemblies involved in mRNA storage and regulation. These structures reflect a shift from active translation to selective mRNA handling and are a hallmark of stress-induced translational control.

Dysregulation of EIF2 alpha phosphorylation has been implicated in a range of diseases, including cancer, neurodegenerative disorders, and metabolic conditions. Sustained activation of this pathway can promote tumor cell survival under hypoxic or nutrient-limited conditions, while aberrant signaling contributes to impaired protein homeostasis in neurodegeneration. Monitoring phosphorylation at Ser51 therefore provides important insight into disease mechanisms and cellular adaptation.

Phospho-EIF2 alpha Antibody, clone RM298, enables selective detection of the activated, phosphorylated form of EIF2 alpha, supporting studies of stress signaling, translational regulation, and cellular response to environmental or pharmacological stimuli. Its ability to distinguish between inactive and active states of EIF2 alpha makes it a valuable tool for investigating pathway activation and dynamic changes in protein synthesis.

For microarray-validated specificity and expanded application data, see our EIF2S1 Antibody (PCRP-EIF2S1-1E2) page.

Application Notes

The stated application concentrations are suggested starting points. Titration of the Phospho-EIF2 alpha (pS51) Antibody / Translation Stress Signaling Marker may be required due to differences in protocols and secondary/substrate sensitivity.

Immunogen

A peptide corresponding the the amino acids surrounding phosphorylated serine 51 was used as the immunogen for the Phospho-EIF2 alpha (pS51) Antibody.

Storage

Store the Phospho-EIF2A antibody at -20oC.

Alternate Names

Phospho-EIF2S1 antibody, eIF2 alpha phospho antibody, eIF2 alpha Ser51 antibody, Phosphorylated EIF2S1 antibody, EIF2S1 pS51 antibody, clone RM298 antibody