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Product Information

Anti-Phospho-AMPA Receptor, GluR1 Subunit (pSer⁸³¹)

Developed in Rabbit, Affinity Isolated Antibody

Product Number **A 4352**

Product Description

Anti-Phospho-AMPA Receptor, GluR1 subunit (pSer⁸³¹) is developed in rabbit using a synthetic phosphopeptide corresponding to a region near serine 831 of rat glutamate receptor (100 kDa) subunit GluR1 as immunogen. The GluR1 sequence is conserved among the species. This sequence has partial homology to VGLUT2. The rabbit serum is affinity purified using epitope-specific affinity chromatography. The antibody is preadsorbed to remove any reactivity toward a non-phosphorylated GluR1 peptide or a serine phosphorylated peptide, irrespective of the sequence.

Anti-AMPA receptor, GluR1 subunit (pSer⁸³¹) recognizes the AMPA receptor GluR1 subunit phosphorylated on serine 831. It is used in immunoblotting, immunoprecipitation, immunohistochemistry and ELISA applications.

Glutamic acid is the major excitatory neurotransmitter in the mammalian central nervous system (CNS). Malfunctioning of the glutamatergic system may be involved in many brain disorders, including epilepsy, anxiety, depression and schizophrenia. Excessive neuronal excitation mediated by glutamic acid is thought to be a factor in the neuronal death after ischemia, and in neurodegenerative diseases, including Alzheimer's. Glutamate receptors are cell-surface proteins that bind glutamic acid and are activated in a variety of normal neurophysiologic processes. The glutamate receptors are divided into two types: ionotropic glutamate receptors, which directly control ion channels, and metabotropic glutamate receptors, which are coupled to G proteins and act through second messenger systems.

Cell surface proteins that bind glutamate and directly gate ion channels in cell membranes, AMPA receptors, exhibit affinity for the agonist AMPA (alpha-amino-3-hydroxy-5-methyl-4-isoxazolepropionic acid). They are the most common mediators of excitatory synaptic transmission in the central nervous system. Several

subtypes have been cloned.¹ AMPA receptor phosphorylation is critical for synaptic plasticity, and identical stimulation conditions recruit different signal transduction pathways depending on synaptic history.² The GluR1 subunit is phosphorylated on multiple sites that are all located on the C-terminus of the protein. Cyclic AMP-dependent protein kinase specifically phosphorylates serine 845 of GluR1 in transfected HEK (human embryonic kidney) cells and in neurons in culture. Phosphorylation of this residue results in a 40% potentiation of the peak current through GluR1 homomeric channels. In addition, protein kinase C specifically phosphorylates serine 831 of GluR1. In the recently proposed transmembrane topology models of glutamate receptors, the C-terminus is located in the intracellular region. The modulation of GluR1 by PKA phosphorylation of serine 845 suggests that phosphorylation of this residue may underlie the PKA-induced potentiation of AMPA receptors in neurons.³ Recent studies in the animal model of depression show that the anti-depressant, fluoxetine, increases phosphorylation of the AMPA receptor subunit GluR1 at serine 831 and 845.⁴

Reagent

Anti-Phospho-AMPA Receptor, GluR1 (Ser⁸³¹) is supplied as a solution in 10 mM HEPES buffer, pH 7.5, containing 150 mM NaCl, 100 µg/ml BSA and 50% glycerol.

Storage/Stability

Store at -20 °C. It will remain liquid for further aliquoting. Due to high viscosity of glycerol, the stock solution needs to be mixed well prior to aliquoting. Working dilution samples should be discarded if not used within 12 hours. The antibody is stable for at least 6 months when stored appropriately. Repeated freezing and thawing is not recommended. Storage in frost-free freezers is also not recommended. If slight turbidity occurs upon prolonged storage, clarify the solution by centrifugation before use. Working dilutions should be discarded if not used within 12 hours.

Product Profile

A minimum working dilution of 1:1,000 is determined by immunoblotting using rat brain (hippocampal) homogenate. The same working dilution may be used in immunoprecipitation, ELISA and immunohistochemistry applications.

Note: In order to obtain the best results using different techniques and preparations, we recommend determining the optimal working dilutions by titration.

References

1. Gregor, P., et al., Chromosomal localization of glutamate receptor genes: relationship to familial amyotrophic lateral sclerosis and other neurological disorders of mice and humans. *Proc. Nat. Acad. Sci. USA*, **90**, 3053-3057 (1993).
2. Lee, H. K., et al., Regulation of distinct AMPA receptor phosphorylation sites during bidirectional synaptic plasticity. *Nature*, **405**, 955-959 (2000).
3. Roche, K. W., et al., Characterization of multiple phosphorylation sites on the AMPA receptor GluR1 subunit. *Neuron*, **6**, 1179-88 (1996).
4. Svenningsson, P., et al., Involvement of striatal and extrastriatal DARPP-32 in biochemical and behavioral effects of fluoxetine (Prozac). *Proc. Natl. Acad. Sci. USA*, **99**, 3182-3187 (2002).

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