

Product Information

ANTI-GLUTAMATE RECEPTOR NMDAR2A (NR2A) Developed in Rabbit, Affinity Isolated Antibody

Product Number **G 9038**

Product Description

Anti-Glutamate Receptor NMDAR2A (NR2A) is developed in rabbit using a synthetic peptide K-SNRRVYKKMPSIESDV corresponding to the C-terminus of NMDAR2A of rat origin (amino acids 1449-1464 with N-terminally added lysine) conjugated to KLH as immunogen. This sequence is identical in human and mouse NMDAR2A and is similar to the NMDAR2B sequence (70% identity). Affinity isolated antigen specific antibody is obtained by immunospecific purification using the NMDAR2A peptide.

Anti-Glutamate Receptor NMDAR2A (NR2A) reacts specifically with NMDAR2A (170 kD) derived from rat brain. By immunoblotting, the antibody detects NR2A from a rat brain synaptosomal fraction. Staining of the NMDAR2A band (170kD) in immunoblotting is specifically inhibited with NMDAR2A peptide (rat, amino acids 1449-1464 with N-terminally added lysine). The antibody may recognize the NMDAR2B subunit (NR2B).

Glutamate receptors are the major excitatory neurotransmitter receptors in the mammalian central nervous system (CNS) and play a central role in brain function and in neurodegenerative disease. Glutamate receptors are divided into two major categories: ionotropic receptors, which function as ligand-gated ion channels, and the metabotropic receptors (mGluRs) which are coupled via G-proteins to second messenger systems. The ionotropic receptors are subdivided into three pharmacologically distinct classes: the AMPA receptors, kainate receptors and the N-methyl-D-aspartate (NMDA) receptors.^{1,2} The NMDA receptors are implicated in synaptic plasticity, neuronal development, in learning and memory, and in the pathogenesis of acute and chronic neurodegenerative disorders. Excessive stimulation of NMDA receptors, also known as glutamate excitotoxicity, can lead to neuronal cell death and may be a common final pathway in several pathological conditions, including stroke, head injury, epilepsy and in neurodegenerative diseases such as Huntington's disease and Alzheimer's disease.³⁻⁵ Molecular cloning has revealed a large family of genes encoding highly related NMDA receptor

subunits.⁶⁻¹⁰ These include the NMDAR1 (also termed NR1 or ζ 1) and the NMDAR2A-NMDAR2D subunits (also termed NR2A-NR2D or ϵ 1- ϵ 4 respectively). Alternative splicing can generate at least eight different NR1 isoforms with distinct functional properties.¹¹ Several lines of evidence indicate that natively expressed NMDA receptors comprise the NR1/ ζ 1 subunit and at least one member of the NR2 class, forming hetero-pentamer complexes, similar to other receptor ion channels. Gene targeting indicates that the subunits ζ 1 and ϵ 2 appear to be essential for NMDA receptor function and survival in newborn mice.¹² The NMDA receptors are highly permeable to Ca^{2+} , Na^+ and K^+ and contain modulatory sites for Mg^{2+} , Zn^{2+} , glycine, protons, and polyamines.² Tyrosine phosphorylation regulates the function of NMDA receptors, which are necessary for induction of long term potentiation (LTP), a mechanism proposed to underlie learning and memory.¹³ Tyrosine phosphorylation of NMDA receptors is thought to be principally mediated by the tyrosine kinase Src. The NMDA receptors interact through their C-terminus with post-synaptic cytoskeletal proteins. These include α -actinin, and PSD-95 proteins that may be involved in the clustering of NMDA receptors at post-synaptic sites, attachment to cytoskeleton, and interaction with downstream signaling proteins, such as nNOS.¹⁴ Antibodies reacting specifically with NMDA receptor subunits may be used to study their expression and function in a variety cell types and tissues and to correlate their expression pattern with physiological functions or pathological conditions.

Reagents

The product is supplied as affinity isolated antibody in 0.01 M phosphate buffered saline, pH 7.4, containing 1% BSA and 15 mM sodium azide as a preservative.

Precautions and Disclaimer

Due to the sodium azide content a material safety data sheet (MSDS) for this product has been sent to the attention of the safety officer of your institution. Consult the MSDS for information regarding hazardous and safe handling practices.

Storage/Stability

For continuous use, store at 2-8 °C for up to one month. For extended storage freeze in working aliquots. Repeated freezing and thawing is not recommended. Storage in "frost-free" freezers is not recommended. If slight turbidity occurs upon prolonged storage, clarify the solution by centrifugation before use.

Product Profile

A minimum working dilution of 1:3,000 is determined by immunoblotting using a synaptosomal fraction of rat brain.

Protein concentration is approximately 0.5 mg/ml by E₂₈₀ prior to the addition of BSA

Note: In order to obtain best results and assay sensitivity in different techniques and preparations we recommend determining optimal working dilutions by titration test.

References

1. Nakanishi, S., *Science* **258**, 597 (1992).
2. Holmann, M., and Heinemann, S., *Ann. Rev. Neurosci.*, **17**, 31 (1994).
3. Choi, D.W., and Rothman, S.M., *Ann. Rev. Neurosci.*, **13**, 171 (1990).
4. Choi, D.W., *Neuron*, **1**, 623 (1988).
5. Olney, J.W., *Ann. Rev. Pharmacol. Toxicol.*, **30**, 47 (1990).
6. Moriyoshi, K., et al., *Nature*, **354**, 31 (1991).
7. Kutsuwada, T., et. al., *Nature*, **358**, 36 (1992).
8. Monyer, H., et al., *Science*, **256**, 1217 (1992).
9. Meguro, H., et al., *Nature*, **357**, 70 (1992).
10. Sucher, N.J., et. al., *Trends Neuropharmacol.*, **17**, 348 (1996).
11. Zukin, R., and Bennet, M., *Trends Neurosci.*, **17**, 306 (1995).
12. Kutsuwada, T., et. al., *Neuron*, **16**, 333 (1996).
13. Smart, T.G., *Curr. Opin. Neurobiol.*, **7**, 358 (1997).
14. Sheng, M., and Kim, E., *Curr. Opin. Neurobiol.*, **6**, 602 (1996).

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