



Product Information

MONOCLONAL ANTI-NICOTINIC ACETYLCHOLINE RECEPTOR, $\alpha 4$ SUBUNIT, CLONE mAb 299 Purified Rat Immunoglobulin

Product Number **M-218**

Product Description

Monoclonal Anti-Nicotinic Acetylcholine Receptor, $\alpha 4$ subunit, (rat IgG1) is produced by immunizing rats with purified nicotinic acetylcholine receptor from rat brain as the immunogen. The epitope is located on the extracellular surface of the $\alpha 4$ subunit of the acetylcholine receptor (AChR).¹ The antibody is then purified using Protein G affinity chromatography.

This antibody binds to native and denatured chick $\alpha 4$ subunit and to denatured rat and human $\alpha 4$.¹ It does not bind well to native mammalian $\alpha 4$. It can also be used on chick, rat and human tissue.

Nicotinic acetylcholine receptors (nAChRs) are a family of ligand-gated ion channels that classified on the basis of their activation by nicotine, although acetylcholine (ACh) is the endogenous ligand. These conductance channels for Ca^{2+} , K^{+} and Na^{+} are pentameric in structure. Nine α ($\alpha 1$ - $\alpha 9$) and three β ($\beta 1$ - $\beta 3$) subunits have been cloned from mammalian and avian sources, each of which has a structural motif of four transmembrane spanning domains, M1-M4, of which M2 lines the channel. In addition, δ and $\gamma(\epsilon)$ subunits are associated with the skeletal muscle of the neuromuscular junction nAChR. The binding site for ACh is formed between α and adjoining structural subunits. The combinations of these various subunits offer a considerable scope for diversity in structure that has only in a few instances been associated with distinct functional effects. The predominant forms of nAChR in the CNS are the $\alpha 4\beta 2$ and $\alpha 7$, the latter of which can form a functional pentameric homomer, although it is controversial whether this occurs in the native state. There is also evidence for an $\alpha 3\beta 2\gamma$ combination.

In addition to the ACh/nicotinic binding site, nAChRs, like other ligand-gated ion channels, have modulatory sites. Sites are present in the channel for anesthetics like lidocaine and phencyclidine as well as the

ubiquitous channel modulator, MK-801, and also for steroid and acetylcholinesterase inhibitors. More recently, the anthelmintic, ivermectin, has been shown to potentially modulate the $\alpha 4$ nAChR. Advances in understanding the role and therapeutic potential of neuronal nAChRs will be dependent on the development of tools, both molecular and chemical, that will allow the association of receptor structure with function.

Reagents

Monoclonal Anti-Nicotinic Acetylcholine Receptor, $\alpha 4$ subunit, is provided diluted in 20 mM sodium phosphate, pH 7.2, containing 150 mM NaCl.

Storage/Stability

For continuous use, store at -80°C for up to one month. For extended storage, solution may be stored at -80°C in working aliquots. Storage in "frost-free" freezers is not recommended. Repeated freezing and thawing is not recommended. If slight turbidity occurs upon prolonged storage, clarify by centrifugation before use.

Product Profile

Recommended starting titer for Monoclonal Anti-Nicotinic Acetylcholine Receptor, $\alpha 4$ subunit, in immunohistochemical applications is 1:800 to 1:8000 depending on receptor concentrations. A goat anti-rat secondary antibody may be used. Optimal working concentration should be determined by serial dilutions.

References

1. Peng, X., et al., "Nicotine-induced increase in neuronal nicotinic receptors results from a decrease in the rate of receptor turnover." *Mol. Pharmacol.* **46**, 523-530 (1994).
2. Whiting, P.J., et al., "Characterization of bovine and human neuronal nicotinic acetylcholine receptors using monoclonal antibodies." *J. Neurosci.* **8**, 3395-3404, (1988).

3. Nakayama, H., et al., "Immunocytochemical localization of nicotinic acetylcholine receptor in rat cerebral cortex." Mol. Brain Res. **32**, 321-328 (1995).
4. Lindstrom, J., "Monoclonal antibodies to nicotinic acetylcholine receptors." Neurotransmissions **12**, No. 2 (1996), RBI, Natick, MA.

KAA 05/01

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