

ProductInformation

Anti-phospho-Growth Associated Protein-43 (GAP-43) (pSer⁴¹)

Developed in Rabbit, Affinity Isolated Antibody

Product Number **G8043**

Product Description

Anti-phospho-Growth-Associated Protein-43 (GAP-43) (pSer⁴¹) is developed in rabbit using a synthetic phosphorylated peptide derived from the region of rat GAP-43 phosphorylated on serine 41 as immunogen. The antiserum is affinity purified using epitope-specific affinity chromatography. Anti-phospho-GAP-43 (pSer⁴¹) recognizes an epitope present on GAP-43 phosphorylated by kinase C. The antibody specifically detects rat GAP-43 protein phosphorylated on serine 41. Due to the high degree of homology between the species the antibody may also detect human and mouse GAP-43 (pSer⁴¹). The antibody may be used in immunoblotting and dot blot applications.

The neural-specific Growth-Associated Protein-43 (GAP-43), also known as B-50, F1, pp46, p57 and neuromodulin, is an intracellular phosphoprotein found exclusively in the peripheral and central nervous systems. GAP-43 is a major protein of axonal growth cones and certain presynaptic terminals while it is absent from dendritic growth cones. GAP-43 has a very acidic isoelectric point (pI) and an anomalous behavior in SDS gels such that its reported molecular mass ranges from 43-57 kDa, whereas the primary sequence of the protein and its hydrodynamic behavior indicate a molecular mass of about 24 kDa.¹

GAP-43 is the major growth cone substrate of protein kinase C (PKC), which phosphorylates GAP-43 on a single site, serine 41. GAP-43 phosphorylated on serine 41 is found in the areas where growth cones make productive, stable contacts with other cells. In contrast, unphosphorylated GAP-43, which binds calmodulin, is always found in the parts of the growth cone that are retracting. Phosphorylated GAP-43 stabilizes long actin filaments ($K_d=161$ nM), while unphosphorylated GAP-43 reduces filament length distribution ($K_d=1.2$ μ M). This shows that post-translational modifications of a single site of GAP-43 directly influence the structure of actin cytoskeleton.^{2,3}

GAP-43 also regulates normal path finding and arborization of 5-HT axons during early brain development. GAP-43-null (GAP43^{-/-}) mice failed almost completely to innervate the cortex and hippocampus with 5-HT immunoreactive axons. Quantitative analysis of brains revealed significant reductions in the density of 5-HT axons in the cortex and hippocampus of GAP43^{-/-} mice relative to wild-type (WT) controls.⁴

Phosphorylation by PKC at serine 41 correlates with nerve-terminal sprouting and long-term potentiation since high levels of GAP-43 persist in neocortical areas and in the limbic system throughout life. This reflects the importance of GAP-43 in mediating experience-dependent plasticity.⁵

Reagent

Anti-phospho-GAP-43 (pSer⁴¹) is supplied as a solution in 10 mM HEPES (pH 7.5), containing 150 mM NaCl, 100 μ g/ml BSA and 50% glycerol.

Storage/Stability

Store at -20 °C. The antibody contains 50% glycerol and remains liquid at -20 °C for further aliquotting. Due to the viscosity of glycerol the solutions need to be mixed well prior to aliquotting. Working dilution samples should be discarded if not used within 12 hours. The antibody is stable for at least 6 months when stored appropriately.

Product Profile

A recommended working dilution of 1:1,000 is determined by immunoblotting using rat brain tissue. Immunoblots may show an additional immunoreactive band at 150-160 kDa, which is also detected by a pan GAP-43 monoclonal antibody and reflects the oligomeric nature of GAP-43.

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

References

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3. Rosner, H., Vacun, G., 1,2-dioctanoyl-s,n-glycerol-induced activation of protein kinase C results in striking, but reversible growth cone shape changes and an accumulation of f-actin and serine 41-phosphorylated GAP-43 in the axonal process. *Eur. J. Cell Biol.*, **78**, 698-706 (1999).
4. Donovan, S. L., et al., GAP-43 is critical for normal development of the serotonergic innervation in forebrain. *J. Neurosci.*, **22**, 3543-3552 (2002).
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