GAP43 Chicken Polyclonal Antibody

CPCA-GAP43

Ordering Information
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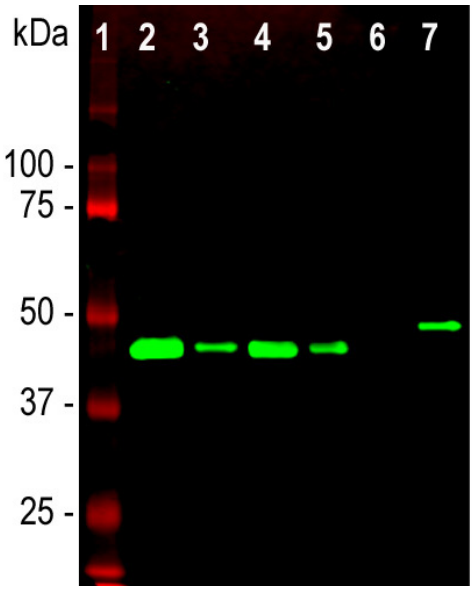
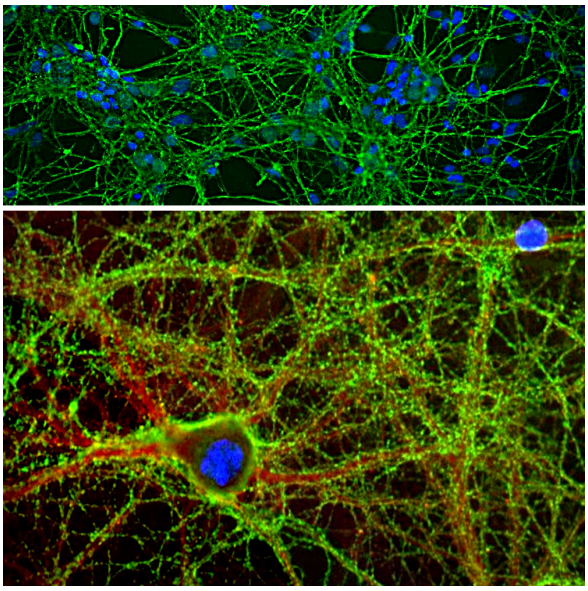
HGNC Name: *GAP43*
UniProt: *P07936*
RRID: *AB_2572284*
Immunogen: *C-terminal peptide of rodent GAP43, KEDPEADQEHA coupled to KLH*
Format: *Concentrated IgY preparation in PBS plus 0.02% NaN_3*
Storage: *Store at 4°C*
Recommended dilutions:
WB: 1:1,000-1-:5,000. IF/ICC: 1:500-1:1,000. IHC not recommended

Applications	Host	Isotype	Molecular Wt.	Species Cross-Reactivity
WB, IF/ICC, not recommended for IHC	Chicken		~43kDa by SDS-PAGE	Hu, Rt, Ms, Co, Pi, Ho, Ck



Western blot analysis of different tissue and cell lysates using chicken pAb to GAP43, CPCA-GAP43, dilution 1:5,000 in green: [1] protein standard (red), [2] rat brain, [3] rat spinal cord, [4] mouse brain, [5] mouse spinal cord, [6] C6 cells, [7] SH-SY5Y cells. Single band at the 43kDa mark corresponds to GAP43. The GAP43 protein only is detected in the lysates of neuronal origin. C6 cells are a rat glioma cell line and do not express GAP43.



Immunofluorescent analysis of cortical neuron-glial cell culture from E20 rat stained with chicken pAb to GAP43, CPCA-GAP43, dilution 1:2,000 in green, and costained with rabbit pAb to α-II spectrin, RPCA-aII-Spec, dilution 1:1,000 in red. The blue is DAPI staining of nuclear DNA. GAP43 antibody labels protein expressed in the axonal membrane and synapses of neuronal cells, while the spectrin antibody stains the submembraneous cytoskeleton of axons and dendrites.

Background:

GAP43 is an abundant protein which is found heavily concentrated in developing neurons, in particular at the growing tips, the growth cones. One group discovered it since it becomes unregulated during the regeneration of the toad optic nerve, and named it "growth associated protein 43", the 43 referring to the apparent molecular weight on SDS-PAGE gels (1). GAP43 is very highly charged and does not run on SDS-PAGE in a fashion which accurately reflects its molecular weight, since human GAP43 is 238 amino acids giving a real molecular weight 24.8kDa. The same GAP43 preparation will also give a different SDS-PAGE molecular weight depending on the percentage acrylamide content of the gel, the protein appearing relatively larger on gels with higher acrylamide concentration. GAP43 proteins from different species also may run at different apparent molecular weights on the same gel. Partly due to these unusual features GAP43 was independently discovered by several different groups and therefore has several alternate names, such as protein F1, pp46, neuromodulin, neural phosphoprotein B-50 and calmodulin-binding protein P-57, the numbers 46, 50 and 57 reflecting the apparent SDS-PAGE molecular weight (2). GAP43 is a major protein kinase C substrate and binds calmodulin avidly, this being mediated by an N-terminal IQ calmodulin binding motif (3). GAP43 may be anchored to the plasma membrane by reversible palmitoylation on two Cys residues close to the N-terminus (4). Knock out of the GAP43 gene in mice is lethal early in postnatal life and is associated with defects in axonal pathfinding (5). GAP43 is one of a large family of "intrinsically disordered proteins" which typically have little defined structure unless they are bound to a more structured partner (6). The CPCA-GAP43 antibody was made against the full length recombinant human protein and binds to GAP43 in rodents and other mammalian species. It binds strongly to growth cones and axonal processes of neurons in cell culture and to synaptic regions in sectioned material for ICC, but is not recommended for IHC. We also supply rabbit polyclonal and mouse monoclonal antibodies to GAP43, RPCA-GAP43, MCA-3H14 and MCA-5E8.

References:

1. Skene JH, Willard M. Changes in axonally transported proteins during axon regeneration in toad retinal ganglion cells. J. Cell Biol. 89:86-95 (1981). 2. Benowitz LI, Routtenberg A. GAP-43: an intrinsic determinant of neuronal development and plasticity. Trends Neurosci. 20:84-91 (1997). 3. Kosik KS, et al. Human GAP-43: its deduced amino acid sequence and chromosomal localization in mouse and human. Neuron 1:137-32 (1988). 4. Gauthier-Kempera A, et al. Interplay between phosphorylation and palmitoylation mediates plasma membrane targeting and sorting of GAP43. Mol Biol Cell. 25:3284-99 (2014). 5. Strittmatter SM, et al. Neuronal pathfinding is abnormal in mice lacking the neuronal growth cone protein GAP-43. Cell 80:445-52 (1995). 6. Wright PE. Dyson HJ. Intrinsically disordered proteins in cellular signalling and regulation. Nat. Rev. Mol. Cell Biol. 16:18-29 (2015).

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Abbreviation Key:

mAb—Monoclonal Antibody pAb—Polyclonal Antibody WB—Western Blot IF—Immunofluorescence ICC—Immunocytochemistry IHC—Immunohistochemistry E—ELISA Hu—Human Mo—Monkey Do—Dog Rt—Rat Ms—Mouse Co—Cow Pi—Pig Ho—Horse Ch—Chicken Dr—D. rerio Dm—D. melanogaster Sm—S. mutans Ce—C. elegans Sc—S. cerevisiae Sa—S. aureus Ec—E. coli.