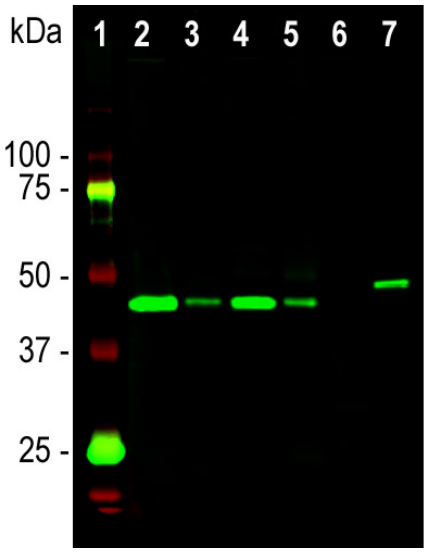
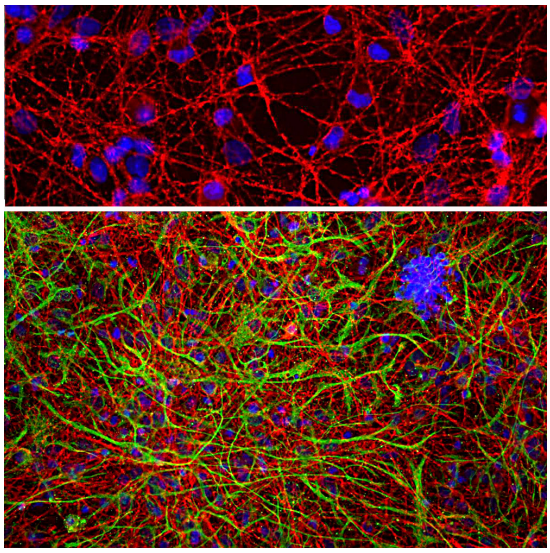
GAP43 Mouse Monoclonal Antibody

MCA-5E8

Applications	Host	Isotype	Molecular Wt.	Species Cross-Reactivity
WB, ICC/IF, IHC	Mouse	IgG1	43kDa by SDS-PAGE	Hu, Rt, Ms



Western blot analysis of tissue and cell lysates using mouse mAb to GAP43, MCA-5E8, dilution 1:2,000, 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. The single band at 43kDa corresponds to GAP43 protein. The protein is expressed in rodent and human neurons and neuronal derived cells but not in C6 cells which are of glial origin. Note that the protein from SH-SY5Y cells, the only line of human origin tested here, has a slightly higher SDS-PAGE size than the rodent proteins.



Immunofluorescent analysis of cortical neuron-glial cell culture from E20 rat stained with mouse mAb to GAP43, MCA-5E8, dilution 1:1,000, in red, and costained with chicken pAb to GFAP, CPCA-GFAP, dilution 1:2,000, in green. The blue is DAPI staining of nuclear DNA. GAP43 antibody labels protein expressed in the axonal membrane of neuronal cells, while the GFAP antibody stains astroglial cells.

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. 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 MCA-5E8 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. The antibody works well for western blotting and for IF, ICC and IHC (see data under "Additional Info" tab). We also supply rabbit and chicken polyclonal antibodies to GAP43, RPCA-GAP43 and CPCA-GAP43 respectively.

Ordering Information
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HGNC Name: *GAP43*
UniProt: *P17677*
RRID: *AB_2572287*
Immunogen: *Recombinant full-length Human GAP43 expressed in and purified from E. coli*
Format: *Purified antibody at 1mg/mL in 50% PBS, 50% glycerol plus 5mM NaN_3*
Storage: *Stable at 4°C for one year, for longer term store at -20°C*
Recommended dilutions:
WB: 1:1,000-5,000 IF/ICC and IHC: 1:1,000-5,000

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).

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.