MAP2A/B Mouse Monoclonal Antibody

MCA-5H11

Ordering Information
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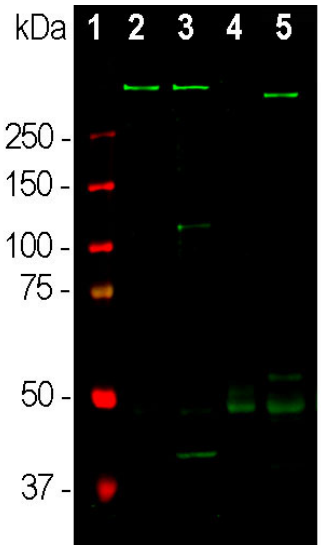
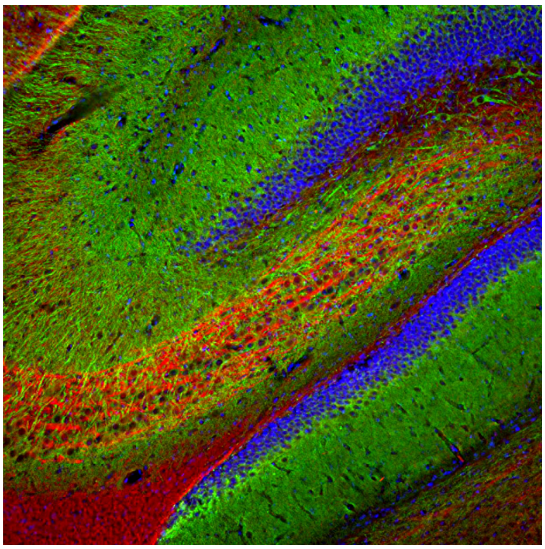
HGNC Name: *MAP2*
UniProt: *P11137*
RRID: *AB_2572347*
Immunogen: *Full length purified bovine protein, epitope mapped to projection domain of human sequence, amino acids 1057-1588 using EnCor product Prot-r-MAP2-P3*
Format: *Purified antibody at 1mg/mL in 50% PBS, 50% glycerol plus 5mM NaN_3*
Storage: *Stable at 4°C for one year, for longer term store at -20°C*
Recommended dilutions:
WB: 1:10,000. IF/ICC and IHC: 1:1,000.

Applications	Host	Isotype	Molecular Wt.	Species Cross-Reactivity
WB, IF/ICC, IHC	Mouse	IgG2b heavy, κ light	~280kDa by SDS-PAGE	Hu, Rt, Ms



Western blot analysis of different tissue lysates using mouse mAb to MAP2A/B, MCA-5H11, dilution 1:10,000 in green: [1] protein standard (red), [2] adult rat whole brain, [2] embryonic (E20) rat brain, [4] adult rat spinal cord, and [5] adult mouse brain lysate. A band at about 280 kDa corresponds to full length MAP2a and MAP2B protein. MAP2A/B is expressed heavily in adult brain particularly in cortical regions, but is a more minor component of spinal cord and almost absent from the embryonic brain sample. Note that since the epitope for this antibody in within the projection domain found only in MAP2A and MAP2B, and so the antibody does not bind to the lower molecular weight MAP2C and MAP2D isoforms which lack this region.



Immunofluorescent analysis of rat hippocampus section stained with mouse mAb to MAP2, MCA-5H11, dilution 1:5,000 in green, and costained with rabbit pAb to α-internexin, RPCA-a-Int, dilution 1:2,000 in red. Following transcardial perfusion of rat with 4% paraformaldehyde, brain was post fixed for 24 hours, cut to 45µM, and free-floating sections were stained with above antibodies. The MCA-5H11 antibody labels MAP2 protein in the perikarya and dendrites of the most neurons, and the α-internexin antibody selectively stains axons and dendrites of neuronal cells.

Background:

Microtubules are 25nm diameter protein rods found in most kinds of eukaryotic cells and are associated with a family of proteins called microtubule associated proteins (MAPs). MAPs play a crucial role in the regulation of microtubule dynamics and interactions *in vivo*. MAP2 was discovered as a high molecular weight MAP with an SDS-PAGE molecular weight of about 280kDa (1-3). A single mammalian MAP2 gene may generate two high molecular weight proteins of ~280kDa named MAP2A and MAP2B and lower molecular weight forms usually named MAP2C and MAP2D which run on SDS-PAGE gels at 60-70kDa. The 60-70kDa forms are found in neurons early in development, but are later replaced by the higher molecular weight forms (2). The MAP2A and MAP2B forms include a long protein sequence which forms fine filamentous protrusions from the sides of brain microtubules, which is therefore referred to as the projection domain. The epitope for this antibody was was mapped to the projection domain so the antibody is specific for MAP2A and MAP2B. This region is one of the prototypes for "intrinsically unstructured regions", a widespread type of protein sequence (4). MAP2 isoforms are expressed only in neurons, specifically in the perikarya and dendrites of these cells. Antibodies to MAP2 isotypes are therefore excellent markers of neuronal dendrites and are useful for identifying neurons in cell culture and sections (e.g. 5-9).

This antibody was raised against a preparation of bovine brain MAP2 and the epitope was mapped to the projection domain using a recombinant construct including amino acids 1057-1507 of the human sequence in Prot-r-MAP2-P3. The antibody works well for western blotting and for IF, ICC and IHC (see data under "Additional Info" tab). EnCor markets an antibody which binds all MAP2 isoforms, MCA-2C4, and another mouse monoclonal antibody which binds a different epitope in the projection domain of MAP2 A and MAP2B binding epitopes only in MAP2A/B MCA-4H5 and MCA-5H11. EnCor also markets a popular chicken polyclonal antibody recognizing MAP2A and MAP2B CPCA-MAP2.

References:

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4. Tompa P. Intrinsically unstructured proteins. Trends Biochem. Sci. 27:527-33 (2002).
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6. Walton, NM, et al. Gliotypic neural stem cells transiently adopt tumorigenic properties during normal differentiation. Stem Cells 27:280-9 (2009).
7. Gasser, A. et al. An ankyrinG-binding motif is necessary and sufficient for targeting Nav1.6 sodium channels to axon initial segments and nodes of Ranvier. J. Neurosci. 32:7232-43 (2012).
8. Rush AM, et al. Differential modulation of sodium channel Nav1.6 by two members of the fibroblast growth factor homologous factor 2 subfamily. Eur. J. Neurosci. 23:2551-62 (2006).
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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.

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