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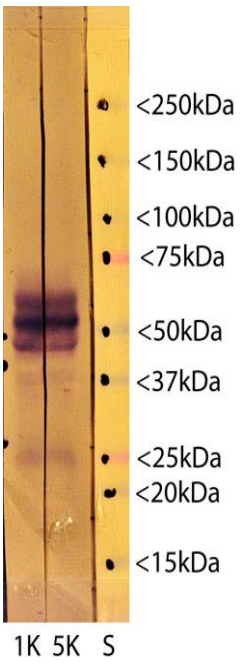
Catalogue# MCA-5B10: Mouse monoclonal antibody to microtubule associated protein tau- MAPT

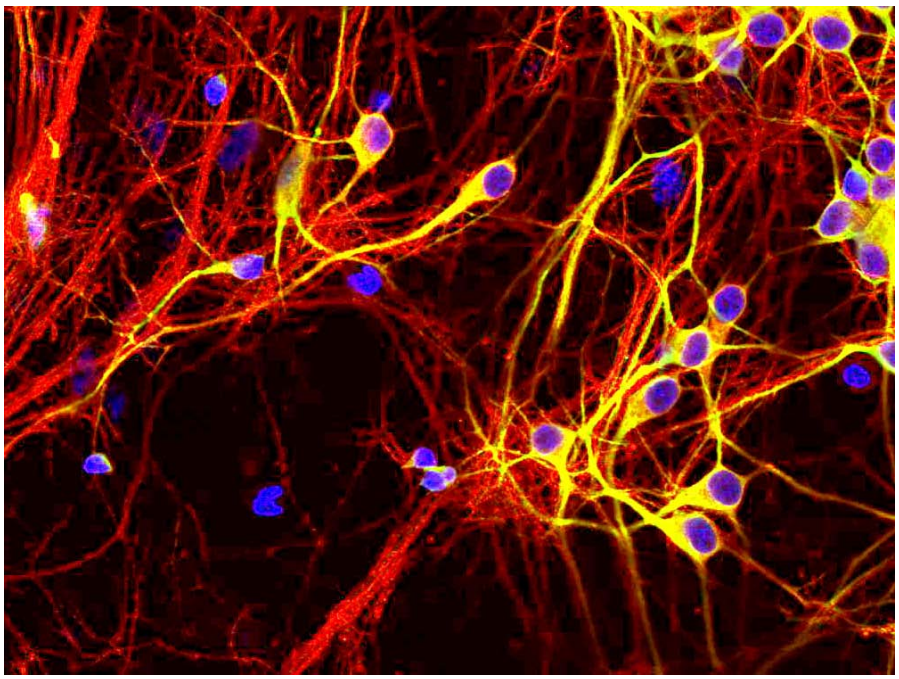
The Immunogen: Tau is a relatively low molecular weight member of the microtubule associated protein or MAP family. Most of these proteins were discovered since microtubules can be polymerized in cell homogenates and pelleted out by centrifugation, typically taking MAP proteins with them (1,2). This early work showed that tau protein facilitated the polymerization of microtubules, and was therefore given the name τ, the Greek letter tau, since it promoted tubule formation. The protein is now usually referred to simply as tau or by the HGNC name which is MAPT.

Tau is heavily concentrated in axons of neurons, but may also be found in dendrites and in some non neuronal cells. Much interest has focused on tau as it is a major component of the neurofibrillary tangles of Alzheimer's disease (3,4). Tau in neurofibrillary tangles is typically heavily and aberrantly phosphorylated, and it is believed that phosphorylation may be involved in tangle formation. In addition, numerous different point mutations in the tau gene are causative of Fronto-temporal dementia with Parkinsonism linked to chromosome 17 (FTDP-17, see 5).

There is one mammalian tau gene which produces at least 9 different proteins by alternate transcription. In the central nervous system 6 isoforms predominant which either include or do not include three short exon coded inserts. These proteins range is size from 352-441 amino acids and run on SDS-PAGE gels as multiple bands ranging from 48-67 kDa. In peripheral nervous system a form called "big tau" predominates, another alternate transcript which includes a 254 amino acid insert (6). This form of tau is found in small amounts in the brain also, in cranial nerve motor nuclei and sensory processes of most sensory ganglia, and runs on SDS-PAGE with an apparent molecular weight of 100 kDa (7).

Each tau protein contains 3 or 4 copies of an 18 amino acid peptide which are responsible for binding to the microtubules and are similar to those found in MAP2 and other members of the MAP family. Tau is a highly charged acidic protein with few hydrophobic residues which belongs to the family of "intrinsically unstructured proteins". As with GAP43, MARCKS and several other similar proteins, tau isoforms run on SDS-PAGE much more slowly than expected from their actual molecular weight.





Figures: Left: Blots of crude rat brain extract stained with MCA-2E9, revealing, as expected, multiple bands in the range 48-67kDa. **Right**: E18 rat brain cultures were grown for 10 days, fixed and immunostained with MCA-5B10 in red and EnCor's chicken antibody to MAP2 (CPCA-MAP2, green) and for DNA (blue). MCA-5B10 stains the neuronal perikarya, dendrites and axonal process strongly and does not stain non neuronal cells in these cultures. The MAP2 antibody also stains neurons only, but only the perikarya and dendrites. As a result perikarya and dendrites appears yellow, since they contain both tau and MAP2, while axons appear red as they contain only tau.

Suggestions for use: Try at dilutions of 1:1,000 and higher for immunofluorescence. For western blots try at 1:10,000. A suitable control tissue is rat spinal cord or peripheral nerve homogenate.

Antibody Characteristics: Our antibody was made against a recombinant construct expressed in and purified from *E. coli* and which corresponded to the shortest version of the various tau proteins, so the antibody is expected to bind to all tau isoforms. MCA-5B10 is an IgG1 class antibody with a κ light chain. Antibody is affinity purified and concentrated to 1 mg/mL in PBS. The preparation contains 5 mM sodium azide as a preservative. Store at 4°C or -20°C. Avoid repeat freezing and thawing.

Limitations: This product is for research use only and is not approved for use in humans or in clinical diagnosis.

References:

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