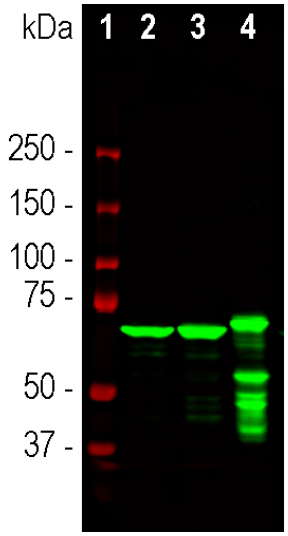
Neurofilament NF-L Mouse Monoclonal Antibody

MCA-1B11

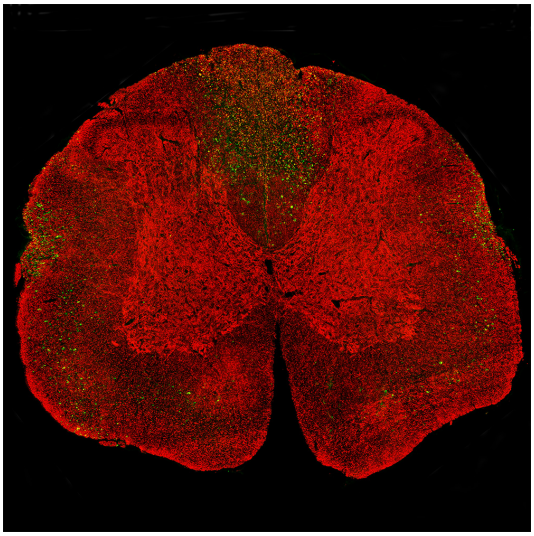
Ordering Information
Web *www.encorbio.com*
Email *admin@encorbio.com*
Phone *352-372-7022*
Fax *352-372-7066*

HGNC Name: *NEFL*
UniProt: *P07196*
RRID: *AB_2737579*
Immunogen: *NF-L purified from pig spinal cord*
Format: *Purified antibody at 1mg/mL in 50% PBS, 50% glycerol plus 5mM NaN_3*
Storage: *Store at 4°C for short term, for longer term at -20°C*
Recommended dilutions:
WB: 1:10,000-1:20,000. IF/ICC and IHC: 1:2,000.

Applications	Host	Isotype	Molecular Wt.	Species Cross-Reactivity
WB, IF/ICC, IHC	Mouse	IgG1 heavy, κ light	68-70kDa	Hu, Rt, Ms, Co, Pi, Ho



Western blot analysis of different tissue lysates using mouse mAb to NF-L, MCA-1B11, dilution 1:20,000 in green: [1] protein standard, [2] rat brain , [3] mouse brain and [4] cow cerebelum. Strong band at about 68-70kDa corresponds to NF-L protein, with the cow protein appearing slightly larger in molecular size as expected. Low molecular weight bands detected in cow brain sample are likely post mortem proteolytic forms of NF-L.



Immunostaining of a coronal section of the spinal cord of a rat given a midline C4 contusion injury three days previously. Sections were stained with RPCA-NF-L-ct in red and MCA-1B11 in green. MCA-1B11 stains prominent aggregates of material concentrated in the lateral funiculi and the dorsal columns but seen in lesser amounts throughout the section. These are degenerating and degenerated axons damaged by the C4 lesion. The RPCA-NF-L-ct antibody binds the C-terminal "tail" region of NF-L which is absent or destroyed during degeneration, so the MCA-1B11 positive profiles are largely negative for RPCA-NF-L-ct.

Background:

Neurofilaments are the 10nm or intermediate filament proteins found specifically in neurons, and are composed predominantly of three major proteins called NF-L, NF-M and NF-H, though other filament proteins, but in certain cell types and during development α-internexin, peripherin, nestin and vimentin may be included also. The major function of neurofilaments is likely to control the diameter of large axons (1). NF-L is the neurofilament light or low molecular weight polypeptide and runs on SDS-PAGE gels at 68-70kDa with some variability across species. Antibodies to NF-L are useful for identifying neuronal cells and their processes in cell culture and sectioned material. NF-L antibody can also be useful for the visualization of neurofilament rich accumulations seen in many neurological diseases, such as Lou Gehrig's disease (ALS), giant axon neuropathy, Charcot-Marie Tooth disease and many others (2-4). Much interest has recently been focused on the detection of NF-L released from neurons into blood and CSF as a surrogate marker of primarily axonal loss in a variety of types of CNS injury and degeneration (5, 6).

The MCA-1B11 antibody was made against a preparation of NF-L protein purified from pig spinal cord. MCA-1B11 is known to bind NF-L from a variety of species including human, rat and mouse, and the epitope is 100% conserved in all mammalian NF-L sequences, so this antibody will have wide applicability. The epitope is very similar to that of the mouse monoclonal antibody UD1 a.k.a. 47.3, the capture reagent in the NF-Light™ assay, the Quanterix Simoa™ and related NF-L assays. We recently characterized the epitopes for both antibodies used in these assays and developed our own versions of them (6, 7). Interestingly the epitopes are mostly hidden in normal neurofilaments but become accessible on degeneration, so that they are novel reagents for studies of neurodegeneration. Full details of these findings are described in our a BioRχiv and in greater detail in a peer-reviewed publication in Brain Communications. It also works well on paraffin embedded histological sections of rodent CNS tissues, including transgenic mouse models. MCA-1B11 is slightly "leaky" in that it binds normal neurofilaments when used at high concentrations but shows strong binding to degenerated material at lower antibody concentrations. Other Uman type antibodies we market are MCA-1D44 and MCA-6H63. Full details of these findings are described in a pending peer-reviewed research report and in our recent BioRχiv article. We also market several other NF-L antibodies including a rabbit and chicken polyclonal antibodies RPCA-NF-L-Degen and CPCA-NF-L-Degen and an epitope mapped mouse monoclonal MCA-DA2.

References:

1. Hoffman PN, et al. Neurofilament gene expression:a major determinant of axonal caliber. PNAS 84:3472-6 (1987).
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3. Lépinoux-Chambaud C. and Eyer J. Review on intermediate filaments of the nervous system and their pathological alterations. Histochem. Cell Biol. 140:13-22 (2013).
4. Liu Q, et al. Neurofilamentopathy in Neurodegenerative Diseases. Open Neurol. J. 5:58–62 (2011).
5. Bacioglu M, et al. Neurofilament light chain in blood and CSF as marker of disease progression in mouse models and in neurodegenerative diseases. Neuron 91:56-66 (2016).
6. Norgren N, Karlsson J, E. Rosengren L. and Stigbrand T. Monoclonal antibodies selective for low molecular weight neurofilaments. Hybrid Hybridomics 21:53-59 (2002).
7. Shaw G, et al. Uman type neurofilament light antibodies are effective reagents for the imaging of neurodegeneration. Brain Communications doi.org/10.1093/braincomms/fcad067.

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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