αII-Spectrin Mouse Monoclonal Antibody

MCA-3D7

Ordering Information
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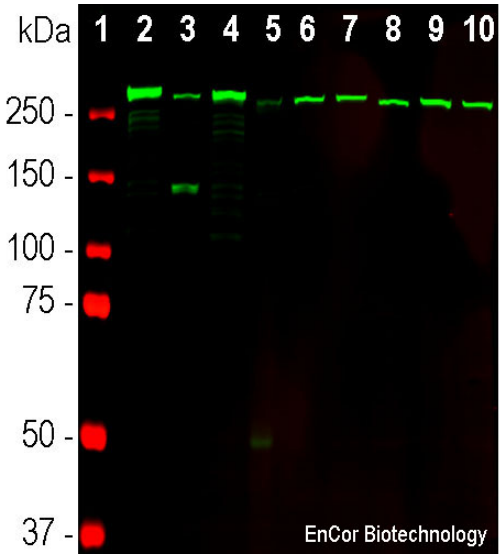
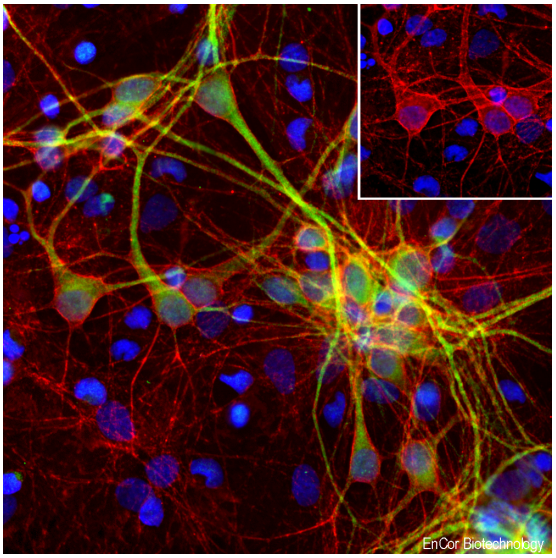
HGNC Name: *SPTAN1*
UniProt: *Q13813*
RRID: *AB_2572381*
Immunogen: *Recombinant C-terminal region of human αII spectrin expressed in and purified from E. coli*
Format: *Purified antibody at 1mg/mL in 50% PBS, 50% glycerol plus 5mM NaN_3*
Storage: *Store at 4°C for short term, for longer term store at -20°C.*
Recommended dilutions:
WB: 1:3,000. IF/ICC: 1:500.

Applications	Host	Isotype	Molecular Wt.	Species Cross-Reactivity
WB, IF/ICC, IHC	Mouse	IgG1	~240kDa	Hu, Rt, Ms



Western blot analysis of different tissue and cell lysates using mouse mAb to αII-specrin, MCA-3D7, dilution 1:2,000 in green: [1] protein standard (in red), [2] rat brain, [3] rat spinal cord, [4] mouse brain, [5] mouse spinal cord, [6] NIH-3T3, [7] HEK293, [8] HeLa, [9] SH-SY5Y, and [10] C6 cells. The prominent band above 250kDa represents the intact αII-spectrin.



Immunofluorescent analysis of cortical neuron-glial cell culture from E20 rat embryos stained with mouse mAb to αII-Spectrin, MCA-3D7, dilution 1:500 in red, and costained with chicken pAb to Microtubule Associated Protein2 (MAP2), CPCA-MAP2, dilution 1:10,000 in green. The blue is Hoechst staining of nuclear DNA. The spectrin antibody stains membranes of neuronal cell body, axons and their dendrites, while MAP2 antibody labels dendrites and perikarya of mature neurons only.

Background:

Spectrin family molecules are important high molecular weight components of the submembranous cytoskeleton of eukaryotic cells. These proteins were isolated originally from lysed red blood cell membrane preparations which were named "ghosts", which gave rise to the name spectrin (1). Spectrin family molecules are mostly composed of spectrin repeats, compact ~110 amino acid modules made of three closely packed α-helices, though they may also include SH3 domains, PH domains, EF hands and other important binding sites. They function as major components of the membraneous cytoskeleton, mediating interactions between integral membrane proteins, actin and many other cellular components. The MCA-3D7 antibody binds specifically to αII-spectrin, also known as non-erythroid spectrin or fodrin (2-4). In the CNS this protein is expressed only in neurons and so the antibody can be used to reveal the submembranous neuronal cytoskeleton in IF, ICC and IHC. Defects in spectrin genes present as a variety of diseases (5,6). The molecule is subject to proteolysis by calpain producing a 150kDa and 145kDa C-terminal fragments and by caspase producing a slightly different 150kDa C-terminal fragment and a 120kDa C-terminal fragment. Since caspase activation is characteristic of apoptosis and calpain activation of necrosis, it may be possible to use selective monitoring of each type of cell death by monitoring the content of these protein fragments (7).

The MCA-3D7 antibody was made against a recombinant human protein construct derived from the C-terminus of αII-spectrin comprising the C-terminal 2 spectrin repeats, specifically amino acids 2086-2447 from AAB41498.1 expressed in and purified from *E. coli*. This antibody can be used to study αII-spectrin on western blots and to visualize the neuronal plasma membrane cytoskeleton in cells in culture and sectioned material.

References:

1. Marchesi VT, Steers E. Selective solubilization of a protein component of the red cell membrane. Science 159:203-4 (1968).
2. Levine J, Willard M. Fodrin: axonally transported polypeptides associated with the internal periphery of many cells. J. Cell Biol. 90:631-42 (1981).
3. Bennett V, Baines AJ. Spectrin and ankyrin-based pathways: metazoan inventions for integrating cells into tissues. Physiol. Rev. 81:1353-92 (2001).
4. Djinovic-Carugo K, Gautel M, Ylänne J, Young P. The spectrin repeat: a structural platform for cytoskeletal protein assemblies. FEBS Lett. 513:119-23 (2002).
5. Bennett V, Healy J. Organizing the fluid membrane bilayer: diseases linked to spectrin and ankyrin. Trends Mol. Med. 14:28-36 (2008).
6. Eber S, Lux SE. Hereditary spherocytosis–defects in proteins that connect the membrane skeleton to the lipid bilayer. Semin. Hematol. 41:118-41 (2004).
7. Mondello S, et al. αII-spectrin breakdown products (SBDPs): diagnosis and outcome in severe traumatic brain injury patients J. Neurotrauma 27:1203-13 (2010).

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.