

## Ordering Information

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**HGNC name:** SPTAN1

**RRID:** AB\_2572381

**Host Species:** Mouse

**Immunogen:** Recombinant construct containing the 13th, 14th and 15th spectrin repeats of human α-II spectrin (amino acids 1398-1685) expressed in and purified from *E. coli*.

**Format:** affinity purified at 1mg/mL in PBS, 50% glycerol, 5mM NaN<sub>3</sub>

**Storage:** Store at 4°C for short term and at -20°C for long term.

Avoid repeated freeze / thaw cycles.

**Recommended dilutions:**

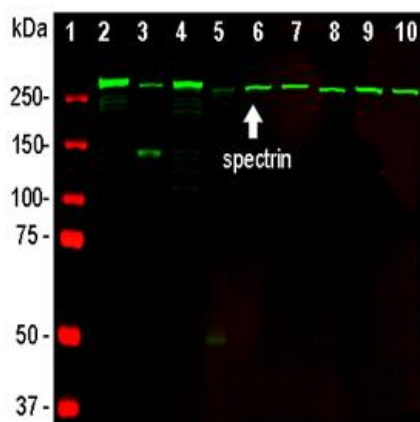
WB: 1:3,000 IF/IHC:1:500

**Application notes:** Neuronal membrane marker

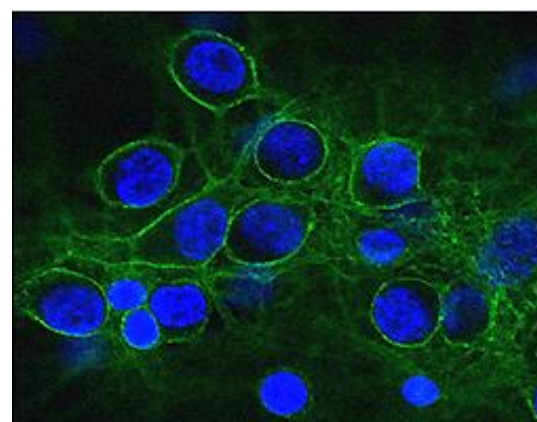
## References:

1. Marchesi VT & Steers E Jr. 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. Djinnovic-Carugo K, Gautel M, Ylännä J & Young P. The spectrin repeat: a structural platform for cytoskeletal protein assemblies. *FEBS Lett.* 513:119-23 (2002).
5. Wang, DS and Shaw G. The association of the C-terminal region of beta I sigma II spectrin to brain membranes is mediated by a PH domain, does not require membrane proteins, and coincides with an inositol-1,4,5 triphosphate binding site. *BBRC* 217:608-15 (1995).
6. Bennett V & Healy J. Organizing the fluid membrane bilayer: diseases linked to spectrin and ankyrin. *Trends Mol Med* 14:28-36 (2008).
7. Eber S & Lux SE. Hereditary spherocytosis—defects in proteins that connect the membrane skeleton to the lipid bilayer. *Semin Hematol* 41:118-41 (2004).

Applications	Host	Isotype	Molecular Wt.	Species Cross-Reactivity
WB, ICC/IF, IHC	M	IgG1	240-260 kDa	H, M, R



**Western blot analysis of neural tissue and cell lysates using Mouse mAb to α-II spectrin (MCA-3D7, green).** [1] protein standard, [2] Rat whole brain, [3] Rat spinal cord, [4] Mouse whole brain, [5] Mouse spinal cord, [6] NIH/3T3, [7] Hek293, [8] HeLa, [9] SH-SY5Y, [10] C6 cells. A prominent band at about 250-260 kDa represents the intact α-II spectrin heavy chain.



**Immunofluorescent analysis of Rat neuron-glia cell cultures stained with Mouse mAb to α-II spectrin visualized with confocal microscopy (MCA-3D7, green).** The MCA-3D7 antibody stains numerous axonal and dendritic profiles in these cultures and clearly reveals the cell submembranous cytoskeleton. The blue is DAPI staining of nuclear DNA.

**Background:** The spectrin family of proteins was originally discovered as the major components of the submembranous cytoskeleton of osmotically lysed red blood cells (1). The lysed blood cells could be seen as clear red cell shaped objects in the light microscope and were referred to as red cell "ghosts". The major proteins of these "ghosts" proved to be actin, ankyrin, band 4.1, and several other proteins including two major bands appearing as 240 kDa and 260 kDa bands on SDS-PAGE gels. This pair of proteins was named "spectrin" since they were discovered in the red blood cell "ghosts" (1). Later work showed that similar high molecular weight bands were seen in membrane fractions from other eukaryotic cell types.

Work by Levine and Willard described a pair of ~240-260 kDa molecular weight proteins which were transported at the slowest rate along mammalian axons (2). They named these proteins "fodrin" as antibody studies showed that they were localized in the sheath under the axonal membrane, but not in the core of the axon (*fodros* means sheath in Greek). Subsequently, fodrin was found to be a member of the spectrin family of proteins, and the spectrin nomenclature is now normally used (3).

Spectrins form tetramers of two α and two β subunits, with the α corresponding to the lower molecular weight ~240 kDa band and the β corresponding to the ~260 kDa. Most spectrin tetramers are about 0.2 microns or 200 nm long, and each α and β subunit has a cell type-specific expression pattern. The basic structure of each spectrin subunit is the **spectrin repeat**, which is a sequence of about 110 amino acids which defines a compact domain containing three closely packed α-helices. Each spectrin subunit contains multiple copies of this repeat, with 20 in each of the α subunits. The β I-IV subunits each contain 17 spectrin repeats, while the β V subunit, also known as β-heavy spectrin, contains 30 of these repeats. The various subunits also contain several other functional domains, allowing the spectrin tetramer to interact with a variety of protein, ionic, and lipid targets. The α-subunits each contain one calmodulin-like calcium binding region and one **Src-homology 3 (SH3) domain**, an abundant domain involved in specific protein-protein interactions. The β subunits all have a N-terminal actin-binding domain and may also have one SH3 domain and one **pleckstrin homology domain**, a multifunctional type of binding domain which in β I spectrin at least binds the membrane lipid PIP<sub>2</sub> (5).

Spectrins are believed to have a function in giving mechanical strength to the plasma membrane since the tetramers associate with each other to form a dense submembranous geodesic meshwork (3). Diseases may be associated with defects in one or more of the spectrin subunits (6). For example, some forms of **hereditary spherocytosis**, the presence of spherical red blood cells which are prone to lysis, can be traced to mutations in some of the spectrin subunits (7). The α-II subunit is widely expressed in tissues but, in the nervous system, is found predominantly in neurons. This antibody can be used to identify neurons and fragments derived from neuronal membranes in cells, in tissue culture, and in tissue sections.

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## Abbreviation Key:

mAb—monoclonal antibody pAb—polyclonal antibody WB—Western IF—Immunofluorescence IHC—Immunohistochemistry ICC—Immunocytochemistry E—ELISA H—human M—mouse R—rat C—chicken B—bovine P—porcine D—dog