

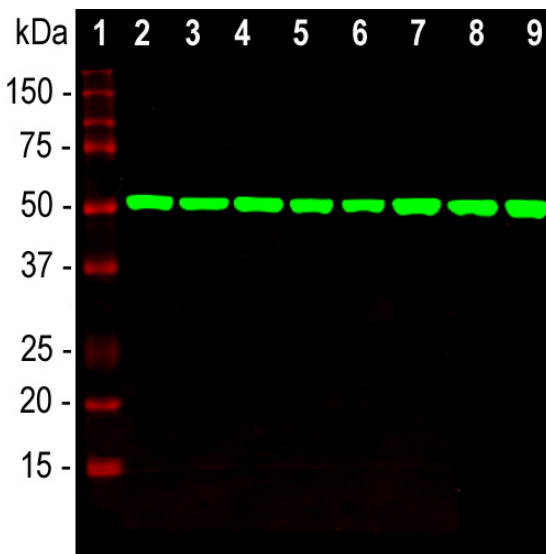
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HGNC Name: TUBB
UniProt: P02554
RRID: AB_2492290
Immunogen: Pig brain tubulin preparation
Format: Purified antibody at 1mg/mL in 50% PBS, 50% glycerol plus 5mM NaNa₂
Storage: Store at 4°C for short term, for longer term at -20°C.
Recommended dilutions:
 WB: 1:5,000-1:10,000, ICC/IF and IHC: 1:1000-1:5,000.

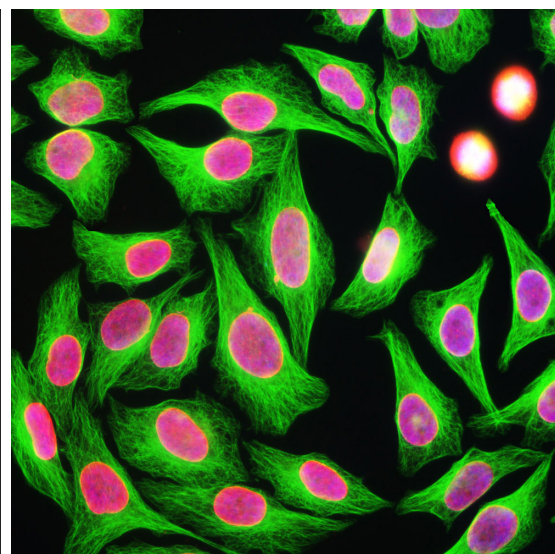
References:

1. Nogales E, Wolf SG, Downing KH. Structure of the alpha-beta tubulin dimer by electron crystallography. *Nature* 391:199-203 (1998)..
2. Nogales E. Structural insight into microtubule function. *Ann. Rev. Biophys. Biomol. Struct.* 30:397-420 (2001).
3. Perez EA. Microtubule inhibitors: Differentiating tubulin-inhibiting agents based on mechanisms of action, clinical activity, and resistance. *Mol. Cancer Ther.* 8:2086-95 (2009).
4. Borisy G, et al. Microtubules: 50 years on from the discovery of tubulin. *Nat. Rev. Mol. Cell Biol.* 17:322-8 (2016).

Applications	Host	Isotype	Molecular Wt.	Species Cross-Reactivity
WB, IF/ICC, IHC	Mouse	IgG2a	50kDa	Hu, Mo, Rt, Ms



Western blot analysis of equal amounts of cell line and whole brain lysates using mouse mAb to β-tubulin MCA-4E4, dilution 1:5,000 in green: [1] protein standard (red), [2] HEK293, [3] HeLa, [4] SH-SY5Y, [5] COS-1, [6] NIH-3T3, [7] C6 cells, [8] rat brain, and [9] mouse brain. Strong band at 50 kDa corresponds to the β-tubulin proteins.



Immunofluorescence analysis of HeLa cells stained with mouse mAb to β-tubulin, MCA-4E4, dilution 1:5,000 in green, and costained with chicken pAb to lamin A/C, [CPCA-LaminAC](#), dilution 1:2,000, in red. Blue is DAPI staining of nuclear DNA. MCA-4E4 antibody produces strong staining of cytoplasmic microtubules, while the lamin A/C antibody specifically labels the nuclear membrane of these cells.

Background:

Tubulins are a major class of cytoskeletal proteins and divided into five distinct classes, namely α, β, γ, δ and ε. The most abundant members of this family are the α and β-tubulins which are the major components of cytoplasmic microtubules. The various subunits have molecular weights of approximately 50kDa and are 50% identical to one another at the protein sequence level. Microtubules are assembled from stable dimers of one α and one β subunit, and regulated polymerization and depolymerization of these dimers controls the number and location of microtubules in cells (1,2). Microtubules are involved in a number of essential cellular functions including the maintenance of cell shape, vesicle and organelle transport, cell motility, cell signaling, meiosis and mitosis. The important role of microtubules in forming the mitotic spindle during cell division makes them a desirable target for the development of therapeutic agents directed against rapidly dividing cancer cells (3). For example, Taxol, a.k.a. Paclitaxel, is a low molecular weight drug which binds αβ tubulin dimers and prevents their polymerization. This prevents formation of the mitotic spindle, inhibits cell division and so halts tumor growth. For an interesting review of the first 50 years of tubulin research see reference 4.

The MCA-4E4 antibody was raised against tubulin purified from pig brain and reacts with [recombinant β-tubulin \(Abcam\)](#), but not [recombinant α-tubulin \(Abnova\)](#) by ELISA and dot blots. β-tubulin is regarded as a “house keeping” protein which is generally not altered much in expression as a result of experimental manipulations. As a result antibodies to β-tubulin are widely used as loading controls in western blotting experiments as a standard by which the levels of other proteins may be measured. As shown here, MCA-4E4 produces a single strong clean band on homogenates of cell and tissue extracts. It will also produce beautiful images of the microtubular network of cells grown in culture and also tissues in sections. MCA-4E4 is an IgG2a class antibody and an alternate antibody useful for certain kinds of experiment is [MCA-1B12](#), an antibody of similar β-tubulin specificity but which is a IgG2b class antibody.

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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.