Datasheet: MCA77P

BATCH NUMBER 170652

Description:	RAT ANTI TUBULIN ALPHA:HRP
Specificity:	TUBULIN ALPHA
Format:	HRP
Product Type:	Monoclonal Antibody
Clone:	YL1/2
Isotype:	IgG2a
Quantity:	0.1 mg

Product Details

Applications

This product has been reported to work in the following applications. This information is derived from testing within our laboratories, peer-reviewed publications or personal communications from the originators. Please refer to references indicated for further information. For general protocol recommendations, please visit www.bio-rad-antibodies.com/protocols.

	Yes	No	Not Determined	Suggested Dilution
Flow Cytometry			▪	
Immunohistology - Frozen	▪			
Immunohistology - Paraffin			▪	
ELISA	▪			
Immunoprecipitation			▪	
Western Blotting	▪			1/100 - 1/1000

Where this antibody has not been tested for use in a particular technique this does not necessarily exclude its use in such procedures. It is recommended that the user titrates the antibody for use in their own system using appropriate negative/positive controls.

Target Species

Yeast

Species Cross Reactivity

Reacts with: Ashbya, Human, Mouse, Dog, Rat, Pig, Drosophila, Saccharomyces, Pleurobrachia, Caenorhabditis, Dictyostelium discoideum, Xenopus, Pig-tailed macaque, Clytia sp., Arabidopsis, Strongylocentrotus purpuratus, Dendraster excentricus, Trypanosoma brucei, Potorous tridactylis, Bovine, Hemicentrotus pulcherrimus, Potato, Bombyx mori, Rhodnius prolixus, Beroe abyssicola, Candida sp.
Does not react with:Nephrotoma suturalis
Based on sequence similarity, is expected to react with:Birds, Echinoderm, Plants, Amphibia
N.B. Antibody reactivity and working conditions may vary between species. Cross reactivity is derived from testing within our laboratories, peer-reviewed publications or personal communications from the originators. Please refer to references indicated for

	further information.
Product Form	Purified IgG conjugated to Horseradish Peroxidase (HRP) - liquid
Preparation	Purified IgG prepared by affinity chromatography on Protein G from tissue culture supernatant.
Buffer Solution	Phosphate buffered saline
Preservative Stabilisers	0.0095% MIT
Approx. Protein Concentrations	IgG concentration 1.0 mg/ml
Immunogen	Yeast tubulin.
RRID	AB_2021090
Fusion Partners	Spleen cells from immunized LOU rats were fused with cells of the Y3.Ag.1.2.3 rat myeloma cell line.
Specificity	**Rat anti tubulin alpha antibody, clone YL1/2** recognizes the alpha subunit of tubulin, specifically binding tyrosylated Tubulin (Tyr-Tubulin) (Wehland *et al.* 1983). The epitope recognized by this antibody has been extensively studied and would appear to be a linear sequence requiring an aromatic residue at the C terminus, with the two adjacent amino acids being negatively charged (represented by Glu-Glu-Tyr in Tyr-Tubulin). The antibody has been used in epitope tagging procedures to detect proteins tagged with a C-terminal Gly-Gly-Phe epitope. These sequence requirements have been reported to result in some cross-reactivity with other proteins in certain circumstances, including *E. coli* rec A and oxidized actin (Burns 1987). Rat anti tubulin alpha antibody, clone YL1/2 is routinely tested in ELISA on tubulin.
Western Blotting	MCA77P is suitable for use as a loading control.
References	1. Kilmartin, J.V. *et al.* (1982) Rat monoclonal anti tubulin antibodies derived by using a new nonsecreting rat cell line. J Cell Biol. 93 (3): 576-82. 2. Wehland, J. *et al.* (1983) A rat monoclonal antibody reacting specifically with the tyrosylated form of alpha-tubulin. I. Biochemical characterization, effects on microtubule polymerization *in vitro*, and microtubule polymerization and organization *in vivo*. J Cell Biol. 97 (5 Pt 1): 1467-75. 3. Wehland, J. *et al.* (1984) Amino acid sequence requirements in the epitope recognized by the alpha-tubulin-specific rat monoclonal antibody YL 1/2. EMBO J. 3 (6): 1295-300. 4. Burns, R. (1987) Cytoskeleton. Tubulin's terminal tyrosine. Nature. 327 (6118): 103-4. 5. Skinner, R.H. *et al.* (1991) Use of the Glu-Glu-Phe C-terminal epitope for rapid purification of the catalytic domain of normal and mutant ras GTPase-activating proteins. J Biol Chem. 266 (22): 14163-6.

6. Berrueta, L. *et al.* (1998) The adenomatous polyposis coli-binding protein EB1 is associated with cytoplasmic and spindle microtubules. Proc Natl Acad Sci U S A. 95: 10596-601.
7. Gordon-Weeks, R. *et al.* (2003) Restricted spatial expression of a high-affinity phosphate transporter in potato roots. J Cell Sci.116: 3135-44.
8. Ligon, L.A. *et al.* (2003) The microtubule plus-end proteins EB1 and dynactin have differential effects on microtubule polymerization. Mol Biol Cell. 14: 1405-17.
9. Müller, S. *et al.* (2004) The plant microtubule-associated protein AtMAP65-3/PLE is essential for cytokinetic phragmoplast function. Curr Biol. 14: 412-7.
10. Dorer, M.S. *et al.* (2006) RNA interference analysis of *Legionella* in *Drosophila* cells: exploitation of early secretory apparatus dynamics. PLoS Pathog. 2(4): e34.
11. Groeger, G. *et al.* (2007) Co-operative Cdc42 and Rho signalling mediates ephrinB-triggered endothelial cell retraction. Biochem J. 404: 23-9.
12. Machado, E. *et al.* (2007) Prostaglandin signaling and ovarian follicle development in the silkmoth, *Bombyx mori*. Insect Biochem Mol Biol. 37: 876-85.
13. Brunk, K. *et al.* (2007) Microcephalin coordinates mitosis in the syncytial *Drosophila* embryo. J Cell Sci. 120: 3578-88.
14. Smertenko, A.P. *et al.* (2008) The C-terminal variable region specifies the dynamic properties of *Arabidopsis* microtubule-associated protein MAP65 isotypes. Plant Cell. 20: 3346-58.
15. Tinkle, C.L. *et al.* (2008) New insights into cadherin function in epidermal sheet formation and maintenance of tissue integrity. Proc Natl Acad Sci U S A. 105: 15405-10.
16. Hartl, T.A. *et al.* (2008) Condensin II resolves chromosomal associations to enable anaphase I segregation in *Drosophila* male meiosis. PLoS Genet. 4(10): e1000228.
17. Jager, M. *et al.* (2008) Insights into the early evolution of SOX genes from expression analyses in a ctenophore. J Exp Zool B Mol Dev Evol. 310: 650-67.
18. von Dassow, G. *et al.* (2009) Action at a distance during cytokinesis. J Cell Biol. 187: 831-45.
19. Vafopoulou, X. (2009) Ecdysteroid receptor (EcR) is associated with microtubules and with mitochondria in the cytoplasm of prothoracic gland cells of *Rhodnius prolixus* (Hemiptera). Arch Insect Biochem Physiol. 72: 249-62.
20. Dupin, I. *et al.* (2009) Classical cadherins control nucleus and centrosome position and cell polarity. J Cell Biol. 185: 779-86.
21. Heaslip, A.T. *et al.* (2009) TgICMAP1 is a novel microtubule binding protein in *Toxoplasma gondii*. PLoS One. 4: e7406.
22. Towers, E. *et al* (2009) The proapoptotic dp5 gene is a direct target of the MLK-JNK-c-Jun pathway in sympathetic neurons. Nucleic Acids Res. 37: 3044-60.
23. Li, Y. *et al.* (2010) The type II *Arabidopsis* formin14 interacts with microtubules and microfilaments to regulate cell division. Plant Cell. 22: 2710-26.
24. Liu, D. *et al.* (2010) Regulated targeting of protein phosphatase 1 to the outer kinetochore by KNL1 opposes Aurora B kinase. J Cell Biol. 188: 809-20.
25. Omri, S. *et al.* (2010) The outer limiting membrane (OLM) revisited: clinical implications. Clin Ophthalmol. 4: 183-95.
26. Wallace, S.W. *et al.* (2010) Cdc42 regulates apical junction formation in human bronchial epithelial cells through PAK4 and Par6B. Mol Biol Cell. 21 (17): 2996-3006.
27. Abe, Y. *et al.* (2010) A single starfish Aurora kinase performs the combined functions of Aurora-A and Aurora-B in human cells. J Cell Sci. 123: 3978-88.

28. Bruce, E.A. *et al.* (2010) The Rab11 pathway is required for influenza A virus budding and filament formation. J Virol. 84: 5848-59.
29. Zenner, H.L. *et al.* (2011) Analysis of Rab GTPase-Activating Proteins Indicates that Rab1a/b and Rab43 Are Important for Herpes Simplex Virus 1 Secondary Envelopment. J Virol. 85: 8012-21.
30. Wise, H.M. *et al.* (2011) Overlapping signals for translational regulation and packaging of influenza A virus segment 2. Nucleic Acids Res. 39: 7775-90.
31. Cheishvili, D. *et al.* (2011) Involvement in Cytoskeleton Regulation and Implication for Familial Dysautonomia. Hum Mol Genet. 20: 1585-94.
32. Wise, H.M. *et al.* (2011) Overlapping signals for translational regulation and packaging of influenza A virus segment 2. Nucleic Acids Res. 39 (17): 7775-90.
33. Stadler, L.K. *et al.* (2011) Structure-function studies of an engineered scaffold protein derived from Stefin A. II: Development and applications of the SQT variant. Protein Eng Des Sel. 24 (9): 751-63.
34. Morishita, D. *et al.* (2011) Cell-permeable carboxyl-terminal p27(Kip1) peptide exhibits anti-tumor activity by inhibiting Pim-1 kinase. J Biol Chem. 286: 2681-8.
35. Timm, T. *et al.* (2011) Microtubule affinity regulating kinase (MARK) activity in living neurons examined by a genetically encoded FRET/FLIM based biosensor: Inhibitors with therapeutic potential. J Biol Chem. 286: 41711-22.
36. Wise, H.M. *et al.* (2012) Identification of a novel splice variant form of the influenza A virus M2 ion channel with an antigenically distinct ectodomain. PLoS Pathog. 8(11): e1002998.
37. Vafopoulou, X. & Steel, C.G. (2012) Cytoplasmic travels of the ecdysteroid receptor in target cells: pathways for both genomic and non-genomic actions. Front Endocrinol (Lausanne). 3: 43.
38. Dayraud, C. *et al.* (2012) Independent specialisation of myosin II paralogues in muscle vs. non-muscle functions during early animal evolution: a ctenophore perspective. BMC Evol Biol. 12: 107.
39. Courtois, A. *et al.* (2012) The transition from meiotic to mitotic spindle assembly is gradual during early mammalian development. J Cell Biol. 198: 357-70.
40. Virágh, E. *et al.* (2012) Specific Cooperation Between Imp-α2 and Imp-β/Ketel in Spindle Assembly During Drosophila Early Nuclear Divisions. G3 (Bethesda). 2 (1): 1-14.
41. Meseroll, R.A. *et al.* (2012) Septin ring size scaling and dynamics require the coiled-coil region of Shs1p. Mol Biol Cell. 23: 3391-406.
42. Bodor, D.L. *et al.* (2013) Assembly in G1 phase and long-term stability are unique intrinsic features of CENP-A nucleosomes. Mol Biol Cell. 24: 923-32.
43. Feau, S. *et al.* (2013) SLAT Regulates CD8+ T Cell Clonal Expansion in a Cdc42- and NFAT1-Dependent Manner. J Immunol. 190: 174-83.
44. De Faveri, L.E. *et al.* (2013) Putative tumour suppressor gene necdin is hypermethylated and mutated in human cancer. Br J Cancer. 108: 1368-77.
45. Liz, M.A. *et al.* (2014) Neuronal deletion of GSK3β increases microtubule speed in the growth cone and enhances axon regeneration via CRMP-2 and independently of MAP1B and CLASP2. BMC Biol. 12: 47.
46. Levy, G.V. *et al.* (2015) Depletion of the SR-Related Protein TbRRM1 Leads to Cell Cycle Arrest and Apoptosis-Like Death in *Trypanosoma brucei*. PLoS One. 10 (8): e0136070.
47. Nunan, R. *et al.* (2015) Ephrin-Bs Drive Junctional Downregulation and Actin Stress

Fiber Disassembly to Enable Wound Re-epithelialization. Cell Rep. 13 (7): 1380-95.
48. Koparir, A. *et al.* (2015) Novel POC1A mutation in primordial dwarfism reveals new insights for centriole biogenesis. Hum Mol Genet. 24 (19): 5378-87.
49. Gaudet, A.D. *et al.* (2015) Galectin-1 in injured rat spinal cord: implications for macrophage phagocytosis and neural repair. Mol Cell Neurosci. 64: 84-94.
50. Jonasson, E.M. *et al.* (2016) Zds1/Zds2-PP2ACdc55 complex specifies signaling output from Rho1 GTPase. J Cell Biol. 212 (1): 51-61.
51. Gholkar, A.A. *et al.* (2016) Fatostatin Inhibits Cancer Cell Proliferation by Affecting Mitotic Microtubule Spindle Assembly and Cell Division. J Biol Chem. 291 (33): 17001-8.
52. Kono, K. *et al.* (2016) Plasma membrane/cell wall perturbation activates a novel cell cycle checkpoint during G1 in *Saccharomyces cerevisiae*. Proc Natl Acad Sci U S A. 113 (25): 6910-5.
53. Schlicher, L. *et al.* (2016) SPATA2 promotes CYLD activity and regulates TNF-induced NF-κB signaling and cell death. EMBO Rep. 17 (10): 1485-97.
54. Vargas, P. *et al.* (2016) Innate control of actin nucleation determines two distinct migration behaviours in dendritic cells. Nat Cell Biol. 18 (1): 43-53.
55. Turnbull, M.L. *et al.* (2016) Role of the B Allele of Influenza A Virus Segment 8 in Setting Mammalian Host Range and Pathogenicity. J Virol. 90 (20): 9263-84.
56. Vafopoulou, X. & Steel, C.G.H. (2016) Mitochondria and the insect steroid hormone receptor (EcR): A complex relationship. Gen Comp Endocrinol. 237: 68-77.
57. Zasadil, L.M. *et al.* (2016) High rates of chromosome missegregation suppress tumor progression but do not inhibit tumor initiation. Mol Biol Cell. 27 (13): 1981-9.
58. Iwasaki, D. *et al.* (2016) The MRX Complex Ensures NHEJ Fidelity through Multiple Pathways Including Xrs2-FHA-Dependent Tel1 Activation. PLoS Genet. 12 (3): e1005942.
59. Kerr, G.W. *et al.* (2016) PP2A(Cdc55)'s role in reductional chromosome segregation during achiasmate meiosis in budding yeast is independent of its FEAR function. Sci Rep. 6: 30397.
60. Takáč, T. *et al.* (2017) Actin depolymerization-induced changes in proteome of *Arabidopsis* roots. J Proteomics. 153: 89-99.
61. Gao, L. *et al.* (2017) Afadin orients cell division to position the tubule lumen in developing renal tubules. Development. 144 (19): 3511-20.
62. Klinger, P. *et al.* (2017) PEDF Is Associated with the Termination of Chondrocyte Phenotype and Catabolism of Cartilage Tissue. Biomed Res Int. 2017: 7183516.
63. Inoue, D. *et al.* (2019) Actin filaments regulate microtubule growth at the centrosome. EMBO J. 38(11): e99630.
64. Norekian, T.P. & Moroz, L.L. (2019) Neural system and receptor diversity in the ctenophore *Beroe abyssicola*. J Comp Neurol. 527 (12): 1986-2008.
65. Sawicki, M.P. *et al.* (2019) Menin Associates With the Mitotic Spindle and Is Important for Cell Division. Endocrinology. 160 (8): 1926-36.
66. Norekian, T.P. & Moroz, L.L. (2019) Neuromuscular organization of the Ctenophore *Pleurobrachia bachei*. J Comp Neurol. 527 (2): 406-36.
67. Patteson, A.E. *et al.* (2019) Loss of Vimentin Enhances Cell Motility through Small Confining Spaces. Small. 15 (50): e1903180.
68. Hughes, S.E. *et al.* (2019) The E3 ubiquitin ligase Sina regulates the assembly and disassembly of the synaptonemal complex in *Drosophila.* females. PLoS Genet. 15 (5): e1008161.
69. Soday, L. *et al.* (2019) Quantitative Temporal Proteomic Analysis of Vaccinia Virus

Infection Reveals Regulation of Histone Deacetylases by an Interferon Antagonist. Cell Rep. 27 (6): 1920-1933.e7.
70. Bernkopf, D.B. *et al.* (2019) An aggregon in conductin/axin2 regulates Wnt/β-catenin signaling and holds potential for cancer therapy. Nat Commun. 10 (1): 4251.
71. Lee, D.K. *et al.* (2019) Cdk5 regulates N-cadherin-dependent neuronal migration during cortical development. Biochem Biophys Res Commun. 514 (3): 645-52.
72. Montesinos, J.C. *et al.* (2020) Phytohormone cytokinin guides microtubule dynamics during cell progression from proliferative to differentiated stage. EMBO J. 39 (17): e104238.
73. Garrido, D. *et al.* (2020) Cyclin B3 activates the Anaphase-Promoting Complex/Cyclosome in meiosis and mitosis. PLoS Genet. 16 (11): e1009184.
74. Norekian, T.P. & Moroz, L.L. (2020) Comparative neuroanatomy of ctenophores: Neural and muscular systems in *Euplokamis dunlapae* and related species. J Comp Neurol. 528 (3): 481-501.
75. Norekian, T.P. & Moroz, L.L. (2020) Atlas of the neuromuscular system in the *Trachymedusa aglantha digitale*: Insights from the advanced hydrozoan. J Comp Neurol. 528 (7): 1231-54.
76. Gallaud, E. *et al.* (2020) Dynamic centriolar localization of Polo and Centrobin in early mitosis primes centrosome asymmetry. PLoS Biol. 18 (8): e3000762.
77. Norekian, T.P. & Moroz, L.L. (2021) Development of the nervous system in the early hatching larvae of the ctenophore *Mnemiopsis leidyi*.. J Morphol. 282 (10): 1466-1477.
78. Iida, T. & Kobayashi, T. (2021) Establishment of an "in saccharo" experimental system. Genes Genet Syst. 96 (3): 107-18.
79. Capitao, C. *et al.* (2021) A CENH3 mutation promotes meiotic exit and restores fertility in SMG7-deficient *Arabidopsis*.. PLoS Genet. 17 (9): e1009779.
80. Sprenger, M. *et al.* (2021) A TRP1-marker-based system for gene complementation, overexpression, reporter gene expression and gene modification in *Candida glabrata*. FEMS Yeast Res.20(8):foaa066.
81. Garcia, Y.A. *et al.* (2021) Mapping Proximity Associations of Core Spindle Assembly Checkpoint Proteins. J Proteome Res. 20 (7): 3414-27.
82. Linville, A.C. *et al.* (2022) Dysregulation of Cellular VRK1, BAF, and Innate Immune Signaling by the Vaccinia Virus B12 Pseudokinase. J Virol. : e0039822.
83. Miete, C. *et al.* (2022) Gαi2-induced conductin/axin2 condensates inhibit Wnt/β-catenin signaling and suppress cancer growth. Nat Commun. 13 (1): 674.
84. Carnesecchi, J. *et al.* (2022) The Hox transcription factor Ultrabithorax binds RNA and regulates co-transcriptional splicing through an interplay with RNA polymerase II. Nucleic Acids Res. 50 (2): 763-783.
85. Yuen, S.W. *et al.* (2023) Polo-like kinase 1 promotes Cdc42-induced actin polymerization for asymmetric division in oocytes Open Biology. 13 (3): 220326.
86. Sawant, P. *et al.* (2023) The role of conserved amino acid residues of Sae3 in Mei5-Sae3 complex for Dmc1 assembly in meiotic recombination. Genes Genet Syst. 98 (1): 45-52.
87. Yang, S. *et al.* (2023) Autoinhibitory mechanism controls binding of centrosomin motif 1 to γ-tubulin ring complex. J Cell Biol. 222 (7): e202007101.
88. Numata-Uematasu, Y. *et al.* (2023) *In vitro* myelination using explant culture of dorsal root ganglia: An efficient tool for analyzing peripheral nerve differentiation and disease modeling. PLoS One. 18 (5): e0285897.

89. Obino, D. *et al.* (2023) Medium-throughput image-based phenotypic siRNA screen to unveil the molecular basis of B cell polarization. Sci Data. 10 (1): 401.
90. Caplan, T. *et al.* (2018) Functional Genomic Screening Reveals Core Modulators of Echinocandin Stress Responses in *Candida albicans*. Cell Rep. 23 (8): 2292-2298.
91. Mourer, T. *et al.* (2023) The Pga59 cell wall protein is an amyloid forming protein involved in adhesion and biofilm establishment in the pathogenic yeast *Candida albicans*. NPJ Biofilms Microbiomes. 9 (1): 6.
92. Bartels, C.B. *et al.* (2021) Short-term testosterone use in female mice does not impair fertilizability of eggs: implications for the fertility care of transgender males. Hum Reprod. 36 (1): 189-98.
93. Norekian, T. *et al.* (2024) A peripheral subepithelial network for chemotactile processing in the predatory sea slug *Pleurobranchaea californica*. PLoS One. 19 (2): e0296872.
94. Weier, A.K. *et al.* (2022) Multiple centrosomes enhance migration and immune cell effector functions of mature dendritic cells. J Cell Biol. 221 (12): e202107134.
95. Poobalasingam, T. *et al.* (2022) The drebrin/EB3 pathway regulates cytoskeletal dynamics to drive neuritogenesis in embryonic cortical neurons. J Neurochem. 160 (2): 185-202.
96. Prasada Rao, H.BD. *et al.* (2021) Phosphorylation of luminal region of the SUN-domain protein Mps3 promotes nuclear envelope localization during meiosis. Elife. 10: e63119.
97. Neves, V. *et al*. (2021) Effects of high temperature on mitotic index, microtubule and chromatin organization in rye (*Secale cereale* L.) root-tip cells. Caryologia. 73 (4): 55-63.
98. Norekian, T.P. & Moroz, L.L. (2021) Development of the nervous system in the early hatching larvae of the ctenophore *Mnemiopsis leidyi*. J Morphol. 282 (10): 1466-1477.
99. Mwaniki, S. *et al.* (2024) Mutational analysis of Mei5, a subunit of Mei5-Sae3 complex, in Dmc1-mediated recombination during yeast meiosis. Genes Cells. Jun 25 [Epub ahead of print].
100. Norekian, T.P. & Moroz, L.L. (2024) The distribution and evolutionary dynamics of dopaminergic neurons in molluscs. bioRxiv. Jun 30 [Epub ahead of print].
101. Janan, M. *et al.* (2024) Blocking microtubule deacetylation inhibits anaphase chromosome movements in crane-fly spermatocytes. PLoS One. 19 (12): e0311691.
102. Girão, H. *et al.* (2024) α-tubulin detyrosination fine-tunes kinetochore-microtubule attachments. Nat Commun. 15 (1): 9720.
103. Norekian, T.P. & Moroz, L.L. (2025) Dopaminergic Central Neurons and Peripheral Sensory Systems in Pteropod and Nudibranch Molluscs. J Comp Neurol. 533 (5): e70054.

Storage	This product is shipped at ambient temperature. It is recommended to aliquot and store at -20°C on receipt. When thawed, aliquot the sample as needed. Keep aliquots at 2-8°C for short term use (up to 4 weeks) and store the remaining aliquots at -20°C. Avoid repeated freezing and thawing as this may denature the antibody. Storage in frost-free freezers is not recommended.
Guarantee	12 months from date of despatch
Health And Safety Information	Material Safety Datasheet documentation #20479 available at: https://www.bio-rad-antibodies.com/SDS/MCA77P

Regulatory	For research purposes only

Related Products

Recommended Useful Reagents

AbGUARD® HRP STABILIZER PLUS (BUF052A)
AbGUARD® HRP STABILIZER PLUS (BUF052B)
AbGUARD® HRP STABILIZER PLUS (BUF052C)
TMB CORE (BUF056A)
TMB CORE+ (BUF062A)
TMB SIGNAL+ (BUF054A)

Product inquiries: www.bio-rad-antibodies.com/technical-support

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