

BACKGROUND

The mammalian target of rapamycin (mTOR) is a serine-threonine kinase related to the lipid kinases of the phosphoinositide 3-kinase (PI3K) family. It controls many aspects of cellular physiology, including transcription, translation, cell size, cytoskeletal organization and autophagy. mTOR partitions between 2 scaffold proteins, raptor and rictor to form two different complexes: mTORC1 and mTORC2, which are differentially regulated, have distinct substrate specificities.¹ mTORC1 is activated in response to growth factors or amino-acids. Amino-acid-signaling to mTORC1 is mediated by Rag GTPases, which cause amino-acid-induced relocalization of mTOR within the endomembrane system. Growth factor stimulated mTORC1 activation involves AKT-mediated phosphorylation of TSC1-TSC2, which leads to the activation of the RHEB GTPase that potently activates the protein kinase activity of mTORC1. Activated mTORC1 up-regulates protein synthesis by phosphorylating key regulators of mRNA translation and ribosome synthesis. mTORC1 phosphorylates EIF4EBP1 and releases it from inhibiting the elongation initiation factor 4E (eIF4E). mTORC1 phosphorylates and activates p70S6K1 at 'Thr-421', which then promotes protein synthesis by phosphorylating PDCD4 and targeting it for degradation. mTORC2 is also activated by growth factors, but seems to be nutrient-insensitive.² mTORC2 seems to function upstream of Rho GTPases to regulate the actin cytoskeleton, probably by activating one or more Rho-type guanine nucleotide exchange factors. mTORC2 promotes the serum-induced formation of stress-fibers or F-actin. mTORC2 plays a critical role in AKT1 'Ser-473' phosphorylation, which may facilitate the phosphorylation of the activation loop of AKT1 on 'Thr-308' by PDK1 which is a prerequisite for full activation. mTORC2 regulates the phosphorylation of SGK1 at 'Ser-422'. mTORC2 also modulates the phosphorylation of PRKCA on 'Ser-657'.³ In addition, mTORC1 is sensitive to the selective inhibitor rapamycin, whereas, mTORC2 is thought to be rapamycin insensitive. Indeed, the activity of mTOR is regulated by the integration of many signals, including growth factors, insulin, nutrients, energy availability and cellular stressors such as hypoxia, osmotic stress, reactive oxygen species and viral infection. High levels of dysregulated mTOR activity are associated with several hamartoma syndromes, including tuberous sclerosis complex, the PTEN-related hamartoma syndromes and Peutz-Jeghers syndrome. These disorders are all caused by mutations in tumor-suppressor genes that negatively regulate mTOR.⁴

References:

1. Mamane, Y. et al: Oncogene 25:6416-22, 2006
2. Corradetti, M.N & Guan, K.L.: Oncogene 25:6347-60, 2006
3. Zeng, Z. et al: Blood 109:3509-12, 2007
4. Tee, A.R. & Blenis, J. : Semin. Cell Dev. Biol. 16:29-37, 2005

TECHNICAL INFORMATION

Source:

mTOR Antibody is a rabbit antibody raised against a short peptide from C-terminal sequence of human mTOR.

Specificity and Sensitivity:

This antibody detects endogenous mTOR proteins without cross-reactivity with other family members.

Storage Buffer: Rabbit IgG in phosphate buffered saline (without Mg²⁺ and Ca²⁺), pH 7.4, 150mM NaCl, 0.02% sodium azide and 50% glycerol.

Storage:

Store at -20°C for at least one year. Store at 4°C for frequent use. Avoid repeated freeze-thaw cycles.

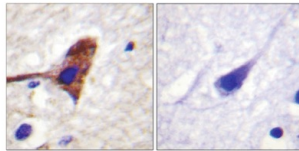
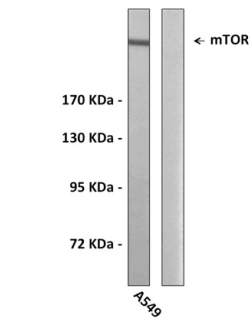
APPLICATIONS

Application:	*Dilution:
WB	1:500-1:1,000
IP	n/d
IHC	1:50-1:100
ICC	n/d
FACS	n/d

**Optimal dilutions must be determined by end user.*



QUALITY CONTROL DATA



Top: Immunoblotting analysis of extracts from A549 cells, using Anti-MTOR, C-Terminal antibody. The lane on the left was treated with the Anti-MTOR, C-Terminal antibody. The lane on the right (negative control) was treated with both Anti-MTOR, C-Terminal antibody and the synthesized immunogen peptide.

Bottom: Immunohistochemistry analysis of paraffin-embedded human brain tissue using Anti-MTOR, C-Terminal antibody. Cells on the left were treated with the Anti-MTOR, C-Terminal antibody. Cells on the right (negative control) were treated with both Anti-MTOR, C-Terminal antibody and the synthesized immunogen peptide.

