

mTOR Antibody
Rabbit Polyclonal Antibody
Catalog # ABV10606**Specification**

mTOR Antibody - Product Information

Application	WB
Primary Accession	P42345
Other Accession	NP_004949.1
Reactivity	Human, Mouse, Rat
Host	Rabbit
Clonality	Polyclonal
Isotype	Rabbit IgG
Calculated MW	288892

mTOR Antibody - Additional Information**Gene ID 2475**

Application & Usage	Western blotting (1:250 - 1:2500). Rat liver tissue lysate can be used as a positive control. However, the optimal concentrations should be determined individually. The antibody recognizes the mTOR of human, mouse, and rat origins. Reactivity to other species has not been tested.
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Other Names

FRAP1, FK506 binding protein 12-rapamycin associated protein 1; FRAP2, FK506 binding protein 12-rapamycin associated protein 2; RAFT1, RAP1

Target/Specificity

mTOR

Antibody Form

Liquid

Appearance

Colorless liquid

Formulation

100 µl affinity purified rabbit polyclonal antibody in phosphate-buffered saline (PBS) containing 30% glycerol, 0.5% BSA and 0.01% thimerosal.

Handling

The antibody solution should be gently mixed before use.

Reconstitution & Storage

-20 °C

Background Descriptions

Precautions

mTOR Antibody is for research use only and not for use in diagnostic or therapeutic procedures.

mTOR Antibody - Protein Information

Name MTOR ([HGNC:3942](#))

Function

Serine/threonine protein kinase which is a central regulator of cellular metabolism, growth and survival in response to hormones, growth factors, nutrients, energy and stress signals (PubMed:12087098, PubMed:12150925, PubMed:12150926, PubMed:12231510, PubMed:12718876, PubMed:14651849, PubMed:15268862, PubMed:15467718, PubMed:15545625, PubMed:15718470, PubMed:18497260, PubMed:18762023, PubMed:18925875, PubMed:20516213, PubMed:20537536, PubMed:21659604, PubMed:23429703, PubMed:23429704, PubMed:25799227, PubMed:26018084, PubMed:29150432, PubMed:31112131, PubMed:31601708, PubMed:32561715, PubMed:34519269, PubMed:29236692, PubMed:37751742). MTOR directly or indirectly regulates the phosphorylation of at least 800 proteins (PubMed:15268862, PubMed:15467718, PubMed:17517883, PubMed:18925875, PubMed:18372248, PubMed:18497260, PubMed:20516213, PubMed:21576368, PubMed:21659604, PubMed:23429704, PubMed:29236692, PubMed:37751742). Functions as

part of 2 structurally and functionally distinct signaling complexes mTORC1 and mTORC2 (mTOR complex 1 and 2) (PubMed: [15268862](http://www.uniprot.org/citations/15268862)), PubMed: [15467718](http://www.uniprot.org/citations/15467718), PubMed: [18925875](http://www.uniprot.org/citations/18925875), PubMed: [18497260](http://www.uniprot.org/citations/18497260), PubMed: [20516213](http://www.uniprot.org/citations/20516213), PubMed: [21576368](http://www.uniprot.org/citations/21576368), PubMed: [21659604](http://www.uniprot.org/citations/21659604), PubMed: [23429704](http://www.uniprot.org/citations/23429704)). In response to nutrients, growth factors or amino acids, mTORC1 is recruited to the lysosome membrane and promotes protein, lipid and nucleotide synthesis by phosphorylating key regulators of mRNA translation and ribosome synthesis (PubMed: [12087098](http://www.uniprot.org/citations/12087098), PubMed: [12150925](http://www.uniprot.org/citations/12150925), PubMed: [12150926](http://www.uniprot.org/citations/12150926), PubMed: [12231510](http://www.uniprot.org/citations/12231510), PubMed: [12718876](http://www.uniprot.org/citations/12718876), PubMed: [14651849](http://www.uniprot.org/citations/14651849), PubMed: [15268862](http://www.uniprot.org/citations/15268862), PubMed: [15467718](http://www.uniprot.org/citations/15467718), PubMed: [15545625](http://www.uniprot.org/citations/15545625), PubMed: [15718470](http://www.uniprot.org/citations/15718470), PubMed: [18497260](http://www.uniprot.org/citations/18497260), PubMed: [18762023](http://www.uniprot.org/citations/18762023), PubMed: [18925875](http://www.uniprot.org/citations/18925875), PubMed: [20516213](http://www.uniprot.org/citations/20516213), PubMed: [20537536](http://www.uniprot.org/citations/20537536), PubMed: [21659604](http://www.uniprot.org/citations/21659604), PubMed: [23429703](http://www.uniprot.org/citations/23429703), PubMed: [23429704](http://www.uniprot.org/citations/23429704), PubMed: [25799227](http://www.uniprot.org/citations/25799227), PubMed: [26018084](http://www.uniprot.org/citations/26018084), PubMed: [29150432](http://www.uniprot.org/citations/29150432), PubMed: [31112131](http://www.uniprot.org/citations/31112131), PubMed: [34519269](http://www.uniprot.org/citations/34519269), PubMed: [29236692](http://www.uniprot.org/citations/29236692)). This includes phosphorylation of EIF4EBP1 and release of its inhibition toward the elongation initiation factor 4E (eIF4E) (PubMed: [24403073](http://www.uniprot.org/citations/24403073), PubMed: [29236692](http://www.uniprot.org/citations/29236692)). Moreover, phosphorylates and activates RPS6KB1 and RPS6KB2 that promote protein synthesis by modulating the activity of their downstream targets including ribosomal protein S6, eukaryotic translation initiation factor EIF4B, and the inhibitor of translation initiation PDCD4 (PubMed: [12150925](http://www.uniprot.org/citations/12150925), PubMed: [12087098](http://www.uniprot.org/citations/12087098), PubMed: [18925875](http://www.uniprot.org/citations/18925875), PubMed: [29150432](http://www.uniprot.org/citations/29150432), PubMed: [29236692](http://www.uniprot.org/citations/29236692)). Stimulates the pyrimidine biosynthesis pathway, both by acute regulation through RPS6KB1-mediated phosphorylation of the biosynthetic enzyme CAD, and delayed regulation, through transcriptional enhancement of the pentose phosphate pathway which produces 5-phosphoribosyl-1- pyrophosphate (PRPP), an allosteric activator of CAD at a later step in synthesis, this function is dependent on the mTORC1 complex (PubMed: [23429704](http://www.uniprot.org/citations/23429704), PubMed: [23429703](http://www.uniprot.org/citations/23429703)). Regulates ribosome synthesis by activating RNA polymerase III-dependent transcription through phosphorylation and inhibition of MAF1 an RNA polymerase III-repressor (PubMed: [20516213](http://www.uniprot.org/citations/20516213)). Activates

dormant ribosomes by mediating phosphorylation of SERBP1, leading to SERBP1 inactivation and reactivation of translation (PubMed: [36691768](http://www.uniprot.org/citations/36691768)). In parallel to protein synthesis, also regulates lipid synthesis through SREBF1/SREBP1 and LPIN1 (By similarity). To maintain energy homeostasis mTORC1 may also regulate mitochondrial biogenesis through regulation of PPARGC1A (By similarity). In the same time, mTORC1 inhibits catabolic pathways: negatively regulates autophagy through phosphorylation of ULK1 (PubMed: [32561715](http://www.uniprot.org/citations/32561715)). Under nutrient sufficiency, phosphorylates ULK1 at 'Ser-758', disrupting the interaction with AMPK and preventing activation of ULK1 (PubMed: [32561715](http://www.uniprot.org/citations/32561715)). Also prevents autophagy through phosphorylation of the autophagy inhibitor DAP (PubMed: [20537536](http://www.uniprot.org/citations/20537536)). Also prevents autophagy by phosphorylating RUBCNL/Pacer under nutrient-rich conditions (PubMed: [30704899](http://www.uniprot.org/citations/30704899)). Prevents autophagy by mediating phosphorylation of AMBRA1, thereby inhibiting AMBRA1 ability to mediate ubiquitination of ULK1 and interaction between AMBRA1 and PPP2CA (PubMed: [23524951](http://www.uniprot.org/citations/23524951), PubMed: [25438055](http://www.uniprot.org/citations/25438055)). mTORC1 exerts a feedback control on upstream growth factor signaling that includes phosphorylation and activation of GRB10 a INSR-dependent signaling suppressor (PubMed: [21659604](http://www.uniprot.org/citations/21659604)). Among other potential targets mTORC1 may phosphorylate CLIP1 and regulate microtubules (PubMed: [12231510](http://www.uniprot.org/citations/12231510)). The mTORC1 complex is inhibited in response to starvation and amino acid depletion (PubMed: [12150925](http://www.uniprot.org/citations/12150925), PubMed: [12150926](http://www.uniprot.org/citations/12150926), PubMed: [24403073](http://www.uniprot.org/citations/24403073)). The non-canonical mTORC1 complex, which acts independently of RHEB, specifically mediates phosphorylation of MIT/TFE factors MITF, TFEB and TFE3 in the presence of nutrients, promoting their cytosolic retention and inactivation (PubMed: [22576015](http://www.uniprot.org/citations/22576015), PubMed: [22343943](http://www.uniprot.org/citations/22343943), PubMed: [22692423](http://www.uniprot.org/citations/22692423), PubMed: [24448649](http://www.uniprot.org/citations/24448649), PubMed: [32612235](http://www.uniprot.org/citations/32612235), PubMed: [36608670](http://www.uniprot.org/citations/36608670), PubMed: [36697823](http://www.uniprot.org/citations/36697823)). Upon starvation or lysosomal stress, inhibition of mTORC1 induces dephosphorylation and nuclear translocation of TFEB and TFE3, promoting their transcription factor activity (PubMed: [22576015](http://www.uniprot.org/citations/22576015), PubMed: [22343943](http://www.uniprot.org/citations/22343943), PubMed: [22692423](http://www.uniprot.org/citations/22692423), PubMed: [24448649](http://www.uniprot.org/citations/24448649), PubMed: [32612235](http://www.uniprot.org/citations/32612235), PubMed: [36608670](http://www.uniprot.org/citations/36608670)). The mTORC1 complex regulates pyroptosis in macrophages by promoting GSDMD oligomerization (PubMed: [34289345](http://www.uniprot.org/citations/34289345)). MTOR phosphorylates RPTOR which in turn inhibits mTORC1 (By similarity). As part of the mTORC2 complex MTOR may regulate other cellular processes including survival and organization of the cytoskeleton (PubMed: [15268862](http://www.uniprot.org/citations/15268862), PubMed: [15467718](http://www.uniprot.org/citations/15467718)). mTORC2 plays a critical role in the phosphorylation at 'Ser-473' of AKT1, a pro-survival effector of phosphoinositide 3- kinase, facilitating its activation by PDK1 (PubMed: [15718470](http://www.uniprot.org/citations/15718470)). mTORC2 may regulate the actin cytoskeleton, through phosphorylation of PRKCA, PXN and activation of the Rho-type guanine nucleotide exchange factors RHOA and RAC1A or RAC1B (PubMed: [15268862](http://www.uniprot.org/citations/15268862)).

mTORC2 also regulates the phosphorylation of SGK1 at 'Ser-422' (PubMed:18925875). Regulates osteoclastogenesis by adjusting the expression of CEBPB isoforms (By similarity). Plays an important regulatory role in the circadian clock function; regulates period length and rhythm amplitude of the suprachiasmatic nucleus (SCN) and liver clocks (By similarity).

Cellular Location

Lysosome membrane; Peripheral membrane protein; Cytoplasmic side Endoplasmic reticulum membrane; Peripheral membrane protein; Cytoplasmic side. Golgi apparatus membrane; Peripheral membrane protein; Cytoplasmic side. Mitochondrion outer membrane; Peripheral membrane protein; Cytoplasmic side. Cytoplasm. Nucleus {ECO:0000250|UniProtKB:Q9JLN9}. Nucleus, PML body {ECO:0000250|UniProtKB:Q9JLN9}. Microsome membrane. Cytoplasmic vesicle, phagosome. Note=Shuttles between cytoplasm and nucleus. Accumulates in the nucleus in response to hypoxia (By similarity). Targeting to lysosomes depends on amino acid availability and RRAGA and RRAGB (PubMed:18497260, PubMed:20381137). Lysosome targeting also depends on interaction with MEAK7. Translocates to the lysosome membrane in the presence of TM4SF5 (PubMed:30956113) {ECO:0000250|UniProtKB:Q9JLN9, ECO:0000269|PubMed:18497260, ECO:0000269|PubMed:20381137, ECO:0000269|PubMed:29750193, ECO:0000269|PubMed:30956113}

Tissue Location

Expressed in numerous tissues, with highest levels in testis.

mTOR Antibody - Protocols

Provided below are standard protocols that you may find useful for product applications.

- [Western Blot](#)
- [Blocking Peptides](#)
- [Dot Blot](#)
- [Immunohistochemistry](#)
- [Immunofluorescence](#)
- [Immunoprecipitation](#)
- [Flow Cytometry](#)
- [Cell Culture](#)

mTOR Antibody - Images

mTOR Antibody - Background

The mammalian target of rapamycin (mTOR, FRAP, RAFT) is a Ser/Thr protein kinase that functions as an ATP and amino acid sensor to balance nutrient availability and cell growth. When sufficient nutrients are available, mTOR responds to a phosphatidic acid-mediated signal to transmit a positive signal to p70 S6 kinase and participate in the inactivation of the eIF4E inhibitor, 4E-BP1. These events result in the translation of specific mRNA subpopulations. mTOR is phosphorylated at Ser2448 via the PI3 kinase/Akt signaling pathway and autophosphorylated at Ser2481. mTOR plays a key role in cell growth and homeostasis and may be abnormally regulated in tumors. For these reasons, mTOR is currently under investigation as a potential target for anti-cancer therapy.