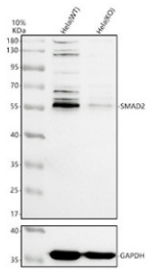
SMAD2 Antibody / Mothers Against Decapentaplegic Homolog 2 Antibody (RQ5451)

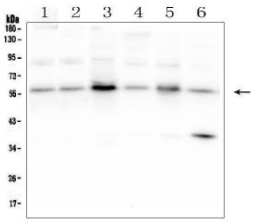
Catalog No.	Formulation	Size
RQ5451	0.5mg/ml if reconstituted with 0.2ml sterile DI water	100 ug

Bulk quote request

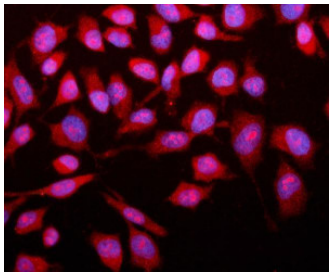
Species Reactivity	Human, Mouse, Rat
Format	Antigen affinity purified
Host	Rabbit
Clonality	Polyclonal (rabbit origin)
Isotype	Rabbit IgG
Purity	Affinity purified
Buffer	Lyophilized from 1X PBS with 2% Trehalose and 0.025% sodium azide
UniProt	Q15796
Applications	Western blot: 0.5-1ug/ml Immunohistochemistry (FFPE): 2-5ug/ml Flow cytometry: 1-3ug/million cells Immunofluorescence: 5ug/ml Direct ELISA: 0.1-0.5ug/ml
Limitations	This SMAD2 Antibody / Mothers Against Decapentaplegic Homolog 2 Antibody is available for research use only.



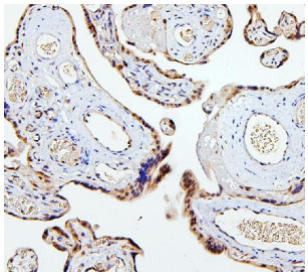
SMAD2 Antibody WB in HeLa Wild-Type and SMAD2 Knockout Cells. Western blot analysis of human HeLa wild-type (lane 1) and SMAD2 knockout (lane 2) whole-cell lysates using the Mothers Against Decapentaplegic Homolog 2 Antibody. A prominent band at approximately 55-58 kDa is detected in wild-type cells and is substantially reduced in the knockout sample, supporting SMAD2-specific recognition. The predicted molecular weight of SMAD2 is approximately 52 kDa. Samples were loaded at 30 ug per lane and separated by 10% SDS-PAGE under reducing conditions. The primary antibody was used at 0.5 ug/ml, with GAPDH serving as the loading control.



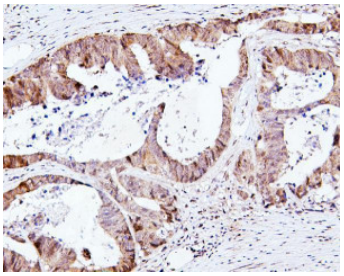
SMAD2 Antibody WB in Human Placenta, Rat Liver, and Mouse Tissues. Western blot analysis of human placenta (lane 1), rat liver (lane 2), mouse testis (lane 3), mouse heart (lane 4), and mouse lung (lanes 5 and 6) tissue lysates using the Mothers Against Decapentaplegic Homolog 2 Antibody. A band is detected at approximately 55-60 kDa in all six lanes, compared with the predicted molecular weight of approximately 52 kDa for SMAD2. Samples were loaded at 50 ug per lane and separated by 5-20% SDS-PAGE under reducing conditions. The primary antibody was used at 0.5 ug/ml.



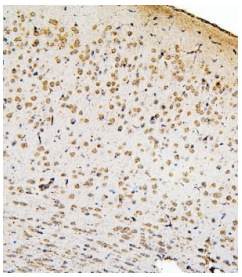
SMAD2 Antibody IF in Human HeLa Cells. Immunofluorescence staining of human HeLa cells using the Mothers Against Decapentaplegic Homolog 2 Antibody at 5 ug/ml, detected with DyLight 594-conjugated goat anti-rabbit IgG (red), with DAPI nuclear counterstaining (blue). SMAD2 immunoreactivity is observed predominantly in the cytoplasm, with perinuclear enrichment and some apparent nuclear staining. Enzymatic antigen retrieval was performed for 15 minutes, followed by blocking with 10% goat serum. The primary antibody was incubated overnight at 4Â°C.



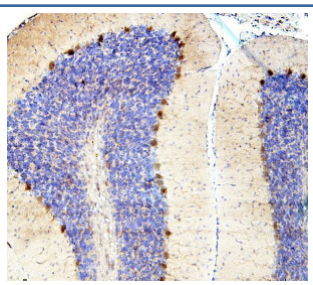
SMAD2 Antibody IHC in Human Placenta. Immunohistochemical staining of FFPE human placenta tissue using the Mothers Against Decapentaplegic Homolog 2 Antibody at 1 ug/ml. Brown DAB staining is observed predominantly in trophoblastic cells surrounding the chorionic villi, with comparatively limited staining in the villous stromal regions. Heat-induced epitope retrieval was performed in citrate buffer (pH 6.0) for 20 minutes, followed by blocking with 10% goat serum. The primary antibody was incubated overnight at 4Â°C, and detection was performed using a biotinylated secondary antibody and streptavidin-biotin complex.



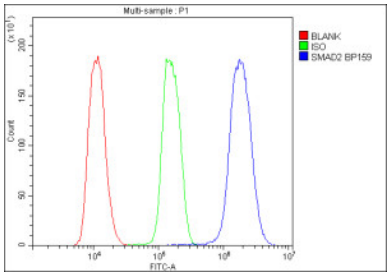
SMAD2 Antibody IHC in Human Colon Cancer. Immunohistochemical staining of FFPE human colon cancer tissue using the Mothers Against Decapentaplegic Homolog 2 Antibody at 1 ug/ml. Brown DAB staining is observed predominantly in the cytoplasm of malignant glandular epithelial cells, with variable nuclear staining and comparatively limited staining in the surrounding stromal tissue. Heat-induced epitope retrieval was performed in citrate buffer (pH 6.0) for 20 minutes, followed by blocking with 10% goat serum. The primary antibody was incubated overnight at 4Â°C, and detection was performed using a biotinylated secondary antibody and streptavidin-biotin complex.



SMAD2 Antibody IHC in Mouse Brain. Immunohistochemical staining of FFPE mouse brain tissue using the Mothers Against Decapentaplegic Homolog 2 Antibody at 1 ug/ml. Brown DAB staining is observed in numerous cells throughout the brain parenchyma, with prominent nuclear and perinuclear immunoreactivity in cells exhibiting neuronal morphology. Heat-induced epitope retrieval was performed in citrate buffer (pH 6.0) for 20 minutes, followed by blocking with 10% goat serum. The primary antibody was incubated overnight at 4Â°C, and detection was performed using a biotinylated secondary antibody and streptavidin-biotin complex.



SMAD2 Antibody IHC in Rat Brain. Immunohistochemical staining of FFPE rat brain tissue using the Mothers Against Decapentaplegic Homolog 2 Antibody at 1 ug/ml. Brown DAB staining is observed in the cerebellar cortex, with prominent immunoreactivity in Purkinje cells along the boundary between the molecular and granular layers. Diffuse staining is also visible in the molecular layer, while the densely packed cells of the granular layer show comparatively limited staining. Heat-induced epitope retrieval was performed in citrate buffer (pH 6.0) for 20 minutes, followed by blocking with 10% goat serum. The primary antibody was incubated overnight at 4Â°C, and detection was performed using a biotinylated secondary antibody and streptavidin-biotin complex.



SMAD2 Antibody FACS in Human K562 Cells. Flow cytometry analysis of fixed and permeabilized human K562 cells using the Mothers Against Decapentaplegic Homolog 2 Antibody at 1 ug per million cells, detected with DyLight 488-conjugated goat anti-rabbit IgG. The antibody-stained population (blue) exhibits a pronounced rightward fluorescence shift relative to the rabbit IgG isotype control (green) and unlabeled cells (red), indicating intracellular SMAD2-associated immunoreactivity. Cells were fixed with 4% paraformaldehyde, permeabilized, and blocked with 10% normal goat serum before staining.

Description

SMAD2 Antibody / Mothers Against Decapentaplegic Homolog 2 Antibody targets SMAD2, a receptor-regulated signaling protein that transmits signals from transforming growth factor-beta (TGF-beta) and activin receptors to the nucleus. SMAD2 belongs to the SMAD family of intracellular signaling mediators and functions alongside SMAD3 in pathways that regulate cell proliferation, differentiation, migration, and tissue homeostasis. Its activity is controlled primarily through phosphorylation by activated type I serine/threonine kinase receptors, allowing extracellular signals to influence transcriptional programs involved in development and cellular responses to environmental changes.

Following ligand binding, TGF-beta or activin receptor complexes activate their associated type I receptors, which phosphorylate SMAD2 at conserved serine residues within its C-terminal SSXS motif. Phosphorylated SMAD2 associates with the common mediator SMAD4, forming complexes that accumulate in the nucleus and regulate gene expression through interactions with DNA-binding transcription factors and transcriptional cofactors. Unlike SMAD3, the predominant full-length SMAD2 isoform contains an insertion within its MH1 domain that limits direct DNA binding. Consequently, SMAD2 relies heavily on interactions with partner proteins to influence transcriptional responses.

SMAD2 contains conserved MH1 and MH2 domains separated by a regulatory linker region. The MH2 domain mediates interactions with receptors, SMAD proteins, and transcriptional regulators, while the linker region contains sites that can be modified by additional signaling pathways. Phosphorylation by MAP kinases and cyclin-dependent kinases can influence SMAD2 stability, localization, and transcriptional activity. These regulatory mechanisms allow TGF-beta signaling to interact with pathways controlling cell cycle progression, cellular stress responses, and differentiation.

SMAD2 signaling contributes to embryonic patterning, mesendoderm specification, epithelial homeostasis, and tissue repair. In cancer, its functions are context dependent. TGF-beta signaling can suppress proliferation during early tumor development, whereas altered pathway regulation may contribute to epithelial-mesenchymal transition, invasion, and metastatic progression in established malignancies. SMAD2 activity is also relevant to fibrotic diseases, where persistent TGF-beta signaling promotes extracellular matrix production and tissue remodeling. Distinguishing total SMAD2 expression from its phosphorylation-dependent activation is important when examining these processes. This SMAD2 Antibody provides a reagent for investigating SMAD2 protein expression and its role in TGF-beta-dependent signaling and transcriptional regulation.

Explore our Signal Transduction Antibodies collection for additional research antibodies targeting proteins involved in TGF-beta signaling, transcriptional regulation, and cellular responses to growth factors.

Application Notes

Optimal dilution of the SMAD2 Antibody / Mothers Against Decapentaplegic Homolog 2 Antibody should be determined by the researcher.

Immunogen

Amino acids E83-Q264 from the human protein were used as the immunogen for the SMAD2 antibody.

Storage

Store the SMAD2 antibody at -20oC.

Alternate Names

SMAD family member 2 antibody, SMAD homolog 2 antibody, Mothers against decapentaplegic homolog 2 antibody, MAD homolog 2 antibody, SMAD2 protein antibody, SMAD2 signaling protein antibody, TGF-beta receptor-regulated SMAD2 antibody, SMAD2 transcriptional regulator antibody

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