abcam

ab227941

Anti-MSH2 antibody [EPR21017-123]

Recombinant | RabMAb | KO Validated

Key facts

Isotype	IgG
Host species	Rabbit
Storage buffer	pH: 7.2 - 7.4 Preservative: 0.01% Sodium azide Constituents: PBS, 40% Glycerol (glycerin, glycerine), 0.05% BSA
Form	Liquid
Clonality	Monoclonal
Immunogen	The exact immunogen used to generate this antibody is proprietary information.
Clone number	EPR21017-123
Purification technique	Affinity purification Protein A
Concentration	0.629 mg/mL The concentration of this product may be batch-dependent Batch concentration finder →

Reactivity data

IP

Tested

Species	Human
Dilution info	1/30
Notes	-

WB

Tested

Species	Human
Dilution info	1/1000
Notes	-

ICC/IF

Tested

Species	Human
Dilution info	1/100
Notes	-

Flow Cyt (Intra)

Tested

Species	Human
Dilution info	1 µg/mL
Notes	MeOH fixationis recommended

IHC-P

Tested

Species	Human
Dilution info	1/8000
Notes	Perform heat-mediated antigen retrieval with Tris/EDTA buffer pH 9.0 before commencing with IHC staining protocol.

Target data

See full target information MSH2

Function	Component of the post-replicative DNA mismatch repair system (MMR). Forms two different heterodimers: MutS alpha (MSH2-MSH6 heterodimer) and MutS beta (MSH2-MSH3 heterodimer) which binds to DNA mismatches thereby initiating DNA

repair. When bound, heterodimers bend the DNA helix and shields approximately 20 base pairs. MutS alpha recognizes single base mismatches and dinucleotide insertion-deletion loops (IDL) in the DNA. MutS beta recognizes larger insertion-deletion loops up to 13 nucleotides long. After mismatch binding, MutS alpha or beta forms a ternary complex with the MutL alpha heterodimer, which is thought to be responsible for directing the downstream MMR events, including strand discrimination, excision, and resynthesis. Recruits DNA helicase MCM9 to chromatin which unwinds the mismatch containing DNA strand (PubMed:26300262). ATP binding and hydrolysis play a pivotal role in mismatch repair functions. The ATPase activity associated with MutS alpha regulates binding similar to a molecular switch: mismatched DNA provokes ADP-->ATP exchange, resulting in a discernible conformational transition that converts MutS alpha into a sliding clamp capable of hydrolysis-independent diffusion along the DNA backbone. This transition is crucial for mismatch repair. MutS alpha may also play a role in DNA homologous recombination repair. In melanocytes may modulate both UV-B-induced cell cycle regulation and apoptosis.

Storage

Shipped at conditions	Conditional Ambient
Appropriate short-term storage duration	1-2 weeks
Appropriate short-term storage conditions	+4°C
Appropriate long-term storage conditions	-20°C
Aliquoting information	Upon delivery aliquot
Storage information	Avoid freeze / thaw cycle

Notes

To see more of the key markers and tools you need to study the hallmarks of cancer, including genome instability and mutation, please visit the following page.

Patented technology
Our RabMAb® technology is a patented hybridoma-based technology for making rabbit monoclonal antibodies. For details on our patents, please refer to RabMAb® patents.

What are the advantages of a recombinant monoclonal antibody?
This product is a recombinant monoclonal antibody, which offers several advantages including:

- High batch-to-batch consistency and reproducibility
- Improved sensitivity and specificity
- Long-term security of supply
- Animal-free batch production

For more information, read more on recombinant antibodies.

Supplementary info

This supplementary information is collated from multiple sources and compiled automatically.

Activity summary	MSH2 also known as MutS Homolog 2 is a human protein with a molecular weight of approximately 100 kDa. It is an important component of the DNA mismatch repair system and plays an essential role in maintaining genomic stability by recognizing and repairing mismatched nucleotides during DNA replication. Expression of the MSH2 protein occurs broadly in dividing cells across various tissues with notable presence in tissues with high proliferation rates such as the colon and the endometrium. Additionally detection and quantification of MSH2 are often performed using methodologies such as MSH2 ELISA which aids in the assessment of its expression levels in different biological samples.
Biological function summary	Components are identified in mismatch repair where MSH2 forms a heterodimer with MSH6 known as the MutSα complex or with MSH3 known as the MutSβ complex. This heterodimerization is critical for the initial steps in the recognition and binding of mismatch errors on the DNA strand. MSH2 complex formation enables it to scan the DNA for errors facilitating the recruitment of additional repair proteins. The activity of MSH2 in these complexes is important in preserving the fidelity of genetic information and prevents mutations that could lead to genomic instability.
Pathways	MSH2 operates within the DNA damage response and repair pathways. The protein is a core component of the mismatch repair pathway which corrects DNA replication errors that elude proofreading activity of DNA polymerases. It interacts with other proteins such as MLH1 and PMS2 forming a synergistic function that amplifies the capacity to recognize and initiate repair of mismatches. The pathway involving MSH2 not only repairs mismatched bases but also plays a role in cell cycle control checkpoints and apoptosis evidencing its pivotal role in maintaining cell cycle integrity.
Associated diseases and disorders	Studies show that MSH2 is strongly associated with Lynch syndrome an autosomal dominant inherited condition that increases the risk of colorectal cancer. Mutations in the MSH2 gene impair its mismatch repair function and lead to microsatellite instability a hallmark of cancer cells in this disorder. Furthermore alterations in the MSH2 protein also relate to glioblastomas with correlations observed between MSH2 expression levels and tumor progression. These conditions exemplify the important role of MSH2 and its interaction with other DNA repair proteins in preventing cancerous developments.

Product promise

Tested

We have tested this species and application combination and it works. It is covered by our product promise.

Expected

We have not tested this specific species and application combination in-house, but expect it will work. It is covered by our product promise.

Predicted

This species and application combination has not been tested, but we predict it will work based on strong homology. However, this combination is not covered by our product promise.

Not recommended

We do not recommend this combination. It is not covered by our product promise.

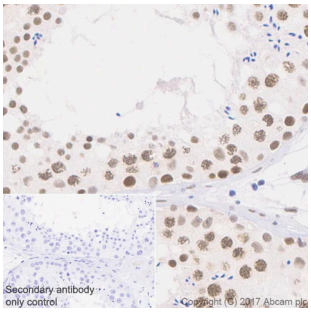
We are dedicated to supporting your work with high quality reagents and we are here for you every step of the way should you need us.

In the unlikely event of one of our products not working as expected, you are covered by our product promise.

Full details and terms and conditions can be found here:
Terms & Conditions.

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9 product images

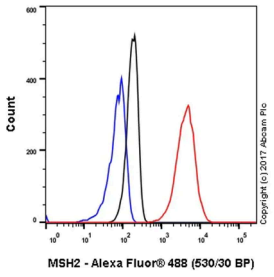


Immunohistochemistry (Formalin/PFA-fixed paraffin-embedded sections) - Anti-MSH2 antibody [EPR21017-123] (ab227941)

MSH2 Immunohistochemistry (Formalin/PFA-fixed paraffin-embedded sections) staining using rabbit Anti-MSH2 antibody

Immunohistochemical analysis of paraffin-embedded human testis tissue labeling MSH2 with ab227941 at 1/8000 dilution, followed by a ready to use Goat Anti-Rabbit IgG H&L (HRP). Nuclear staining in human testis was observed (PMID: 10029069). Counter stained with Hematoxylin. Secondary antibody only control: Used PBS instead of primary antibody, secondary antibody is a ready to use Goat Anti-Rabbit IgG H&L (HRP).

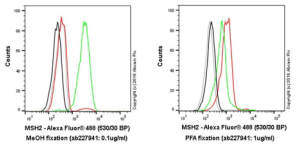
Perform heat mediated antigen retrieval using ab93684 (Tris/EDTA buffer, pH 9.0).



Flow Cytometry (Intracellular) - Anti-MSH2 antibody [EPR21017-123] (ab227941)

MSH2 Flow Cytometry (Intracellular) staining using rabbit Anti-MSH2 antibody

Intracellular flow cytometric analysis of 4% paraformaldehyde-fixed, 90% methanol-permeabilized A-375 (humanmalignant melanoma cell line) cell line labeling MSH2 with ab227941 at 1/600 dilution (red) compared with a Rabbit IgG, monoclonal [EPR25A] - Isotype Control (ab172730) (black) and an unlabeled control (cells without incubation with primary antibody and secondary antibody) (blue). Goat Anti-Rabbit IgG H&L (Alexa Fluor® 488) (ab150077) at 1/2000 dilution was used as the secondary antibody.



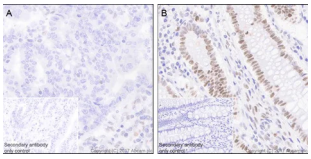
Flow Cytometry (Intracellular) - Anti-MSH2 antibody [EPR21017-123] (ab227941)

MSH2 Flow Cytometry (Intracellular) staining using rabbit Anti-MSH2 antibody

Overlay histogram showing HAP1 wildtype (green line) and HAP1-MSH2 knockout cells (red line) stained with ab227941. The cells were fixed with 80% methanol (5 min) (left panel) or 4% formaldehyde (10 min) (right panel) , and then permeabilized with 0.1% PBS-Triton X-100 for 15 min. The cells were then incubated in 1x PBS / 10% normal goat serum to block non-specific protein-protein interactions followed by ab227941 for 30 min at 22°C. The secondary antibody used was Alexa Fluor® 488 goat anti-rabbit IgG (H&L) presorbed (ab150081) at 1/2000 dilution for 30 min at 22°C.
A rabbit IgG isotype control antibody (ab172730) was used at the same concentration and conditions as the primary antibody (HAP1 wildtype - black line, HAP1-MSH2 knockout - grey line). Unlabelled sample was also used as a control (this line is not shown for the purpose of simplicity).

Acquisition of >5,000 events were collected using a 50 mW Blue laser (488nm) and 530/30 bandpass filter.

Note: We recommend fixing cells using MeOHinstead of PFA toget optimal results.

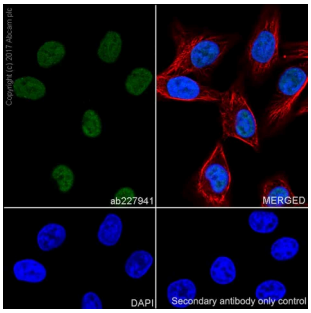


Immunohistochemistry (Formalin/PFA-fixed paraffin-embedded sections) - Anti-MSH2 antibody [EPR21017-123] (ab227941)

MSH2 Immunohistochemistry (Formalin/PFA-fixed paraffin-embedded sections) staining using rabbit Anti-MSH2 antibody

Immunohistochemical analysis of paraffin-embedded human colon cancer tissue labeling MSH2 with ab227941 at 1/8000 dilution, followed by a ready to use Goat Anti-Rabbit IgG H&L (HRP). Nuclear staining in para-carcinoma colonic epithelium (image B) or stromal cells (both image A and B) and loss of expression in the paired colon cancer (image A) (PMID: 24710284). Counter stained with Hematoxylin.
Secondary antibody only control: Used PBS instead of primary antibody, secondary antibody is a ready to use Goat Anti-Rabbit IgG H&L (HRP).

Perform heat mediated antigen retrieval using ab93684 (Tris/EDTA buffer, pH 9.0).

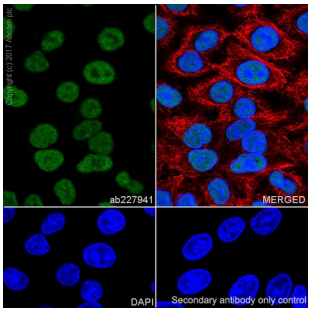


Immunocytochemistry/ Immunofluorescence - Anti-MSH2 antibody [EPR21017-123] (ab227941)

MSH2 Immunocytochemistry/ Immunofluorescence staining using rabbit Anti-MSH2 antibody

Immunofluorescent analysis of 100% methanol-fixed A-375 (human malignant melanoma cell line) cells labeling MSH2 with ab227941 at 1/100 dilution, followed by Goat Anti-Rabbit IgG H&L (Alexa Fluor® 488) (ab150077) secondary antibody at 1/1000 dilution (green). Nuclear staining in A-375 cell line is shown.
The nuclear counter stain is DAPI (blue). Tubulin is detected with Anti-alpha Tubulin antibody [DM1A] - Microtubule Marker (Alexa Fluor® 594) (ab195889) (red) at 1/200 dilution.

Secondary antibody only control: Used PBS instead of primary antibody, secondary antibody is Goat Anti-Rabbit IgG H&L (Alexa Fluor® 488) (ab150077) secondary antibody at 1/1000 dilution.

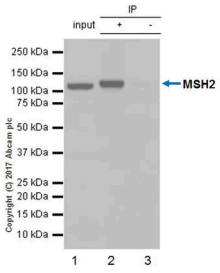


Immunocytochemistry/ Immunofluorescence - Anti-MSH2 antibody [EPR21017-123] (ab227941)

MSH2 Immunocytochemistry/ Immunofluorescence staining using rabbit Anti-MSH2 antibody

Immunofluorescent analysis of 100% methanol-fixed A549 (human lung carcinoma cell line) cells labeling MSH2 with ab227941 at 1/100 dilution, followed by Goat Anti-Rabbit IgG H&L (Alexa Fluor® 488) (ab150077) secondary antibody at 1/1000 dilution (green). Nuclear staining in A549 cell line is shown.
The nuclear counter stain is DAPI (blue). Tubulin is detected with Anti-alpha Tubulin antibody [DM1A] - Microtubule Marker (Alexa Fluor® 594) (ab195889) (red) at 1/200 dilution.

Secondary antibody only control: Used PBS instead of primary antibody, secondary antibody is Goat Anti-Rabbit IgG H&L (Alexa Fluor® 488) (ab150077) secondary antibody at 1/1000 dilution.



Immunoprecipitation - Anti-MSH2 antibody [EPR21017-123] (ab227941)

MSH2 was immunoprecipitated from 0.35 mg of A-375 (human malignant melanoma cell line) lysate with ab227941 at 1/30 dilution. Western blot was performed from the immunoprecipitate using ab227941 at 1/1000 dilution. VeriBlot for IP Detection Reagent (HRP) (ab131366), was used for detection at 1/10000 dilution.
Lane 1: A-375 whole cell lysate 10 µg (Input).

Lane 2: ab227941 IP in A-375 whole cell lysate.

Lane 3: Rabbit monoclonal IgG (ab172730) instead of ab227941 in A-375 whole cell lysate.

Exposure time: 1 second.

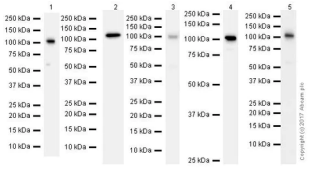
Blocking and dilution buffer concentration: 5% NFDM/TBST.

All lanes:
Immunoprecipitation - Anti-MSH2 antibody [EPR21017-123] (ab227941)

Developed using the ECL technique.

Predicted band size: 105 kDa

Observed band size: 105 kDa



Western blot - Anti-MSH2 antibody [EPR21017-123] (ab227941)

Exposure times: Lane 1: 100 seconds; Lane 2: 3 minutes; Lane 3: 10 seconds; Lane 4: 1 minute; Lane 5: 15 seconds.
Blocking/Dilution buffer: 5% NFDM/TBST.

The blot was developed on a BIO-RAD® ChemiDoc™ MP instrument.

All lanes:
Western blot - Anti-MSH2 antibody [EPR21017-123] (ab227941) at 1/1000 dilution

Lane 1:
HeLa (human epithelial cell line from cervix adenocarcinoma) whole cell lysate at 10 µg

Lane 2:
A549 (human lung carcinoma epithelial cell), whole cell lysate at 10 µg

Lane 3:
Human fetal heart lysate at 10 µg

Lane 4:
Human tonsil lysate at 10 µg

Lane 5:
A-375 (human malignant melanoma epithelial cell), whole cell lysate at 10 µg

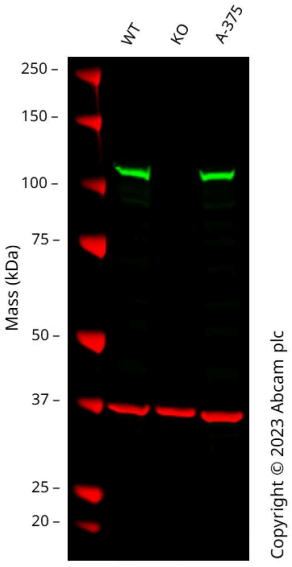
Secondary

All lanes:
Western blot - Goat Anti-Rabbit IgG H&L (HRP) (ab97051) at 1/100000 dilution

Developed using the ECL technique.

Predicted band size: 105 kDa

Observed band size: 104 kDa



Western blot - Anti-MSH2 antibody [EPR21017-123] (ab227941)

MSH2 Western blot staining using rabbit Anti-MSH2 antibody

Western blot: Anti-MSH2 antibody [EPR21017-123] (ab227941) staining at 1/1000 dilution, shown in green; Mouse anti-GAPDH antibody [6C5] (ab8245) loading control staining at 1/20000 dilution, shown in red. In Western blot, ab227941 was shown to bind specifically to MSH2. A band was observed at 104 kDa in wild-type HCT 116 cell lysates with no signal observed at this size in MSH2 knockout cell line. To generate this image, wild-type and MSH2 knockout HCT 116 cell lysates were analysed. First, samples were run on an SDS-PAGE gel then transferred onto a nitrocellulose membrane. Membranes were blocked in 5 % milk in TBS-0.1 % Tween® 20 (TBS-T) before incubation with primary antibodies overnight at 4 °C. Blots were washed four times in TBS-T, incubated with secondary antibodies for 1 h at room temperature, washed again four times then imaged. Secondary antibodies used were Goat anti-Rabbit IgG H&L 800CW and Goat anti-Mouse IgG H&L 680RD at 1/20000 dilution.
All lanes:
Western blot - Anti-MSH2 antibody [EPR21017-123] (ab227941) at 1/1000 dilution

Lane 1:
Wild-type HCT 116 cell lysate at 20 µg

Lane 2:
MSH2 knockout HCT 116 cell lysate at 20 µg

Lane 3:
A-375 cell lysate at 20 µg

Observed band size: 104 kDa

Please note: All products are 'FOR RESEARCH USE ONLY. NOT FOR USE IN DIAGNOSTIC OR THERAPEUTIC PROCEDURES'.