abcam

ab286909

Anti-SARS-CoV-2 nsp13 antibody [EPR24838-18]

Recombinant | RabMAb | 20ul selling size

Key facts

Isotype	IgG
Host species	Rabbit
Storage buffer	pH: 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	EPR24838-18
Purification technique	Affinity purification Protein A
Concentration	0.533 mg/mL The concentration of this product may be batch-dependent Batch concentration finder →

Reactivity data

ICC/IF

Tested

Species	Recombinant full length protein - SARS-CoV-2
Dilution info	-
Notes	-

Predicted

Species	SARS-CoV-2
Dilution info	-
Notes	-

Not recommended

Species	Recombinant fragment - SARS-CoV-2
Dilution info	-
Notes	-

Flow Cyt (Intra)

Tested

Species	Recombinant full length protein - SARS-CoV-2
Dilution info	-
Notes	-

Predicted

Species	SARS-CoV-2
Dilution info	-
Notes	-

Not recommended

Species	Recombinant fragment - SARS-CoV-2
Dilution info	-
Notes	-

I-ELISA

Tested

Species	Recombinant fragment - SARS-CoV-2

Dilution info	-
Notes	0.016-1000 ng/mL

Predicted

Species	SARS-CoV-2
Dilution info	-
Notes	-

Not recommended

Species	Recombinant full length protein - SARS-CoV-2
Dilution info	-
Notes	-

WB

Tested

Species	Recombinant fragment - SARS-CoV-2
Dilution info	1/1000
Notes	-

Predicted

Species	SARS-CoV-2
Dilution info	-
Notes	-

Not recommended

Species	Recombinant full length protein - SARS-CoV-2
Dilution info	-
Notes	-

Target data

See full target information rep

Function

Replicase polyprotein 1ab. Multifunctional protein involved in the transcription and replication of viral RNAs. Contains the proteinases responsible for the cleavages of the polyprotein. Host translation inhibitor nsp1. Inhibits host translation by associating with the open head conformation of the 40S subunit (PubMed:32680882, PubMed:32908316, PubMed:33080218, PubMed:33479166). The C-terminus binds to and obstructs ribosomal mRNA entry tunnel (PubMed:32680882, PubMed:32908316, PubMed:33080218, PubMed:33479166). Thereby inhibits antiviral response triggered by innate immunity or interferons (PubMed:32680882, PubMed:32979938, PubMed:33080218). The nsp1-40S ribosome complex further induces an endonucleolytic cleavage near the 5'UTR of host mRNAs, targeting them for degradation (By similarity). This inhibits the integrated stress response (ISR) in the infected cell by preventing EIF2S1/eIF2-alpha phosphorylation upstream of stress granule formation and depletes host G3BP1 (PubMed:36534661). Viral mRNAs less susceptible to nsp1-mediated inhibition of translation, because of their 5'-end leader sequence (PubMed:32908316, PubMed:33080218). Non-structural protein 2. Enhances mRNA repression of the 4EHP-GYF2 complex in the host, thereby inhibiting the antiviral response and facilitating SARS-CoV-2 replication. Possibly acts in cooperation with nsp1, which induces ribosome stalling on host mRNA, triggering mRNA repression by the host 4EHP-GYF2 complex which is enhanced by nsp2. Papain-like protease nsp3. Responsible for the cleavages located at the N-terminus of the replicase polyprotein. Participates together with nsp4 in the assembly of virally-induced cytoplasmic double-membrane vesicles necessary for viral replication (PubMed:35551511). Antagonizes innate immune induction of type I interferon by blocking the phosphorylation, dimerization and subsequent nuclear translocation of host IRF3 (PubMed:32733001). Also prevents host NF-kappa-B signaling (By similarity). In addition, PL-PRO possesses a deubiquitinating/deISGylating activity and processes both 'Lys-48'- and 'Lys-63'-linked polyubiquitin chains from cellular substrates (PubMed:32726803). Cleaves preferentially ISG15 from antiviral protein IFIH1 (MDA5), but not RIGI (PubMed:33727702). Can play a role in host ADP-ribosylation by ADP-ribose (PubMed:32578982). Plays a role in the formation and maintenance of double membrane vesicles (DMVs) replication organelles (PubMed:35551511). DMVs are formed by nsp3 and nsp4, while nsp6 zippers ER membranes and connects to lipid droplets (PubMed:35551511). Non-structural protein 4. Plays a role in the formation and maintenance of double membrane vesicles (DMVs) replication organelles (PubMed:35551511). DMVs are formed by nsp3 and nsp4, while nsp6 zippers ER membranes and connects to lipid droplets (PubMed:35551511). 3C-like proteinase nsp5. Cleaves the C-terminus of replicase polyprotein at 11 sites (PubMed:32321856). Recognizes substrates containing the core sequence [ILMVF]-Q-|-[SGACN] (PubMed:32198291, PubMed:32272481). Cleaves and inactivates human TRMT1, preventing tRNA guanine(26)-dimethylation of tRNAs (PubMed:37073102, PubMed:38814682, PubMed:39773525). May cleave human NLRP1 in lung epithelial cells, thereby activating the NLRP1 inflammasome pathway (PubMed:35594856). May cleave human GSDMD, triggering alternative GSDME-mediated epithelial cell death upon activation of the NLRP1 inflammasome, which may enhance the release interleukins 1B, 6, 16 and 18 (PubMed:35594856). Also able to bind an ADP-ribose-1''-phosphate (ADRP) (PubMed:32198291, PubMed:32272481). Non-structural protein 6. Plays a role in the formation and maintenance of double membrane vesicles (DMVs) replication organelles (PubMed:35551511). DMVs are formed by nsp3 and nsp4, while nsp6

zippers ER membranes and connects to lipid droplets (PubMed:35551511). LDs are consumed during DMV formation (PubMed:35551511). Binds to host TBK1 without affecting TBK1 phosphorylation; the interaction with TBK1 decreases IRF3 phosphorylation, which leads to reduced IFN-beta production (PubMed:32979938). Non-structural protein 7. Plays a role in viral RNA synthesis (PubMed:32277040, PubMed:32358203, PubMed:32438371, PubMed:32526208). Forms a hexadecamer with nsp8 (8 subunits of each) that may participate in viral replication by acting as a primase. Alternatively, may synthesize substantially longer products than oligonucleotide primers (By similarity). Non-structural protein 8. Plays a role in viral RNA synthesis (PubMed:32277040, PubMed:32358203, PubMed:32438371, PubMed:32526208). Forms a hexadecamer with nsp7 (8 subunits of each) that may participate in viral replication by acting as a primase. Alternatively, may synthesize substantially longer products than oligonucleotide primers (By similarity). Interacts with ribosome signal recognition particle RNA (SRP) (PubMed:33080218). Together with NSP9, suppress protein integration into the cell membrane, thereby disrupting host immune defenses (PubMed:33080218). Viral protein genome-linked nsp9. Forms a primer, NSP9-pU, which is utilized by the polymerase for the initiation of RNA chains (PubMed:37794589). Interacts with ribosome signal recognition particle RNA (SRP) (PubMed:33080218). Together with NSP8, suppress protein integration into the cell membrane, thereby disrupting host immune defenses (PubMed:33080218). Non-structural protein 10. Plays a pivotal role in viral transcription by stimulating both nsp14 3'-5' exoribonuclease (By similarity) and nsp16 2'-O-methyltransferase activities (PubMed:35944563). Therefore plays an essential role in viral mRNAs cap methylation. RNA-directed RNA polymerase nsp12. RNA-directed RNA polymerase that catalyzes the transcription of viral genomic and subgenomic RNAs. Acts in complex with nsp7 and nsp8 to transcribe both the minus and positive strands of genomic RNA (PubMed:32277040, PubMed:32358203, PubMed:32438371, PubMed:32526208). The kinase-like NiRAN domain of NSP12 attaches one or more nucleotides to the amino terminus of NSP9, forming a covalent RNA-protein intermediate that serves as transcription/replication primer (PubMed:37794589). Subgenomic RNAs (sgRNAs) are formed by discontinuous transcription: The polymerase has the ability to pause at transcription-regulating sequences (TRS) and jump to the leader TRS, resulting in a major deletion (PubMed:35706445). This creates a series of subgenomic RNAs that are replicated, transcribed and translated (PubMed:35706445). In addition, Nsp12 is a subunit of the viral RNA capping enzyme that catalyzes the RNA guanylyltransferase reaction for genomic and sub-genomic RNAs (PubMed:35944563). Subsequently, the NiRAN domain transfers RNA to GDP, and forms the core cap structure GpppA-RNA (PubMed:35944563). Helicase nsp13. Plays a role in viral RNA synthesis (PubMed:33232691). Multi-functional protein with a zinc-binding domain in N-terminus displaying RNA and DNA duplex-unwinding activities with 5' to 3' polarity. Activity of helicase is dependent on magnesium (By similarity). Binds to host TBK1 and inhibits TBK1 phosphorylation; the interaction with TBK1 decreases IRF3 phosphorylation, which leads to reduced IFN-beta production (PubMed:32979938). Guanine-N7 methyltransferase nsp14. Plays a role in viral RNA synthesis through two distinct activities. The N7-guanine methyltransferase activity plays a role in the formation of the cap structure GpppA-RNA (PubMed:35944563). The proofreading exoribonuclease reduces the sensitivity of the virus to RNA mutagens during replication (By similarity). This activity acts on both ssRNA and dsRNA in a 3'-5' direction (By similarity). Uridylate-specific endoribonuclease nsp15. Plays a role in viral transcription/replication and prevents the simultaneous activation of host cell dsRNA sensors, such as MDA5/IFIH1, OAS, and PKR (By similarity). Acts by degrading the 5'-polyuridines generated during replication of the poly(A) region of viral genomic and

subgenomic RNAs (PubMed:33504779, PubMed:33564093). Catalyzes a two-step reaction in which a 2'3'-cyclic phosphate (2'3'-cP) is first generated by 2'-O transesterification, which is then hydrolyzed to a 3'-phosphate (3'-P) (PubMed:33504779, PubMed:33564093). If not degraded, poly(U) RNA would hybridize with poly(A) RNA tails and activate host dsRNA sensors (By similarity). May bind genomic dsRNA in association with the replication-transcription complex (RTC), and play a role in nsp12 discontinous transcription (PubMed:34562452, PubMed:35706445). 2'-O-methyltransferase nsp16. Methyltransferase that mediates mRNA cap 2'-O-ribose methylation to the 5'-cap structure of viral mRNAs (PubMed:35944563). N7-methyl guanosine cap is a prerequisite for binding of nsp16 (PubMed:35944563). Therefore, it plays an essential role in cap methylation of viral mRNAs, which is essential to evade the immune system, especially when restricted by human IFIT1 and IFIT3 (PubMed:35944563, PubMed:36722972, PubMed:36285486). May disrupt host mRNA splicing in nucleus by interacting with pre-mRNA Recognition Domains of the U1 and U2 snRNAs (PubMed:33080218).

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

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	SARS-CoV-2 nsp13 also known as the helicase protein is a non-structural protein involved in the replication of the virus SARS-CoV-2. Weighing around 66 kDa this protein is expressed in the infected host cells. Nsp13 exhibits RNA helicase activity unwinding RNA secondary structures and equipped with 5'-triphosphatase activity it facilitates RNA replication and transcription. It ensures full-length synthesis of viral RNAn important for viral proliferation and genome stability.
Biological function summary	Nsp13 contributes in processes essential for SARS-CoV-2's lifecycle. This protein acts as a part of the viral replication and transcription complex where it coordinates with other non-structural proteins. Within this complex it maintains its helicase function which is imperative for elongating the nascent RNA strand. Nsp13 binds with nsp12 the RNA-dependent RNA polymerase playing a critical role in synthesizing viral RNA through successfully clearing RNA-based hindrances.
Pathways	SARS-CoV-2 nsp13 is involved in the viral replication and host cell interaction pathway fundamentally impacting host cellular machinery. Considered a critical player in the viral life cycle it interacts with proteins like nsp8 and nsp12 enhancing RNA synthesis and processing activities in the virus. These interactions position nsp13 as a target in antiviral drug development efforts aiming to disrupt viral RNA synthesis pathways.
Associated diseases and disorders	SARS-CoV-2 nsp13 has a direct relationship with COVID-19 the disease caused by SARS-CoV-2 infection. This protein contributes to the pathogenesis of COVID-19 by assisting in viral replication facilitating the virus's survival within the host. Research also links nsp13 function to immune system challenges as it associates with proteins like nsp14 involved in evading host immune responses worsening the clinical outcomes in COVID-19 patients.

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

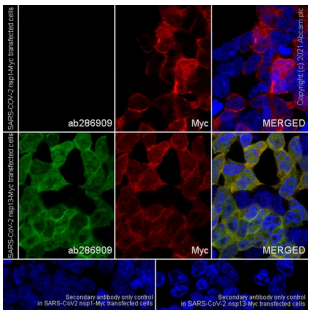
We do not recommend this combination. It is not covered by our product promise.

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.

4 product images



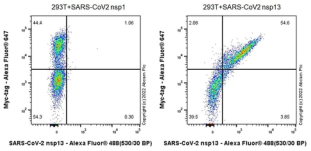
Immunocytochemistry/ Immunofluorescence - Anti-SARS-CoV-2 nsp13 antibody [EPR24838-18] (ab286909)

SARS-CoV-2 nsp13 Immunocytochemistry/ Immunofluorescence staining using rabbit Anti-SARS-CoV-2 nsp13 antibody

Immunofluorescent analysis of 4% Paraformaldehyde fixed 0.1% TritonX-100 permeabilised HEK-293T (Human embryonic kidney 293) cells labelling Anti-SARS-CoV-2 nsp13 with ab286909 at 1/500 dilution, followed by AlexaFluor®488 Goat anti-Rabbit secondary (ab150081) antibody at 1/1000 dilution.
Confocal image showing cytoplasmic and nuclear staining in HEK-293T cells transfected with a SARS-CoV-2 nsp13 expression vector containing a myc tag, and no staining in HEK-293T cells transfected with a SARS-CoV-2 nsp1 expression vector containing a myc tag. Image was taken with a confocal microscope (Leica-Microsystems, TCS SP8).

Myc-Tag Mouse mab (Alexa Fluor® 647) was used to counterstain Myc-Tag at 1/100 dilution (Red). The Nuclear counterstain was DAPI.

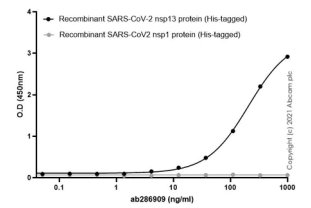
Secondary antibody only control: AlexaFluor®488 Goat anti-Rabbit (ab150081) at 1/1000 dilution.



Flow Cytometry - Anti-SARS-CoV-2 nsp13 antibody [EPR24838-18] (ab286909)

SARS-CoV-2 nsp13 Flow Cytometry staining using rabbit Anti-SARS-CoV-2 nsp13 antibody

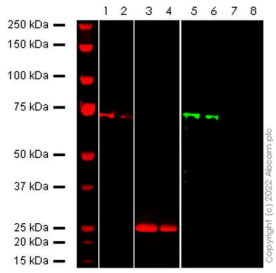
Flow cytometric analysis 4% Paraformaldehyde fixed 90% methanol permeabilised HEK-293T (Human embryonic kidney epithelial cell) cells transfected with a SARS-CoV-2 nsp1 (Left) or SARS-CoV2 nsp13 (Right) expression vector containing a myc tag labelling SARS-CoV-2 nsp13 with ab286909 at 1/50 dilution. Goat anti rabbit IgG (Alexa Fluor® 488) (ab150081) at 1/5000 dilution was used as the secondary antibody. Alexa Fluor® 647 Anti-Myc tag antibody [9E10] (ab223895) was used to label transfected cells.



Indirect ELISA - Anti-SARS-CoV-2 nsp13 antibody [EPR24838-18] (ab286909)

Indirect ELISA- Anti-SARS-CoV2 NSP13 antibody (ab286909)
Indirect ELISA showing primary antibody ab286909 binding to recombinant SARS-CoV-2 nsp13 protein (His-tagged). Plates were coated with recombinant SARS-CoV-2 nsp13 protein (His-tagged) and recombinant SARS-CoV2 nsp1 protein (His-tagged) at 1000 ng/ml. Binding of ab286909 was assessed in a serial dilution range 0.016- 1000 ng/mL (a 3-fold serial dilution).

Binding was detected using pre-adsorbed secondary antibody, goat anti-rabbit IgG H&L (HRP, ab97080) at 1/2000 dilution.



Western blot - Anti-SARS-CoV-2 nsp13 antibody [EPR24838-18] (ab286909)

ab286909 was shown to bind specifically to SARS-CoV-2 nsp13 protein in western blot. 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 (IRDye® 800CW) preabsorbed (ab216773) and Goat anti-Mouse IgG H&L (IRDye® 680RD) preabsorbed (ab216776) at 1/20000 dilution.
Blocking buffer: 5% milk in TBS-0.1% Tween® 20 (TBS-T)

Lanes 1 - 4:
Western blot - Anti-6X His tag® antibody [HIS.H8] (ab18184) at 1/1000 dilution

Lanes 5 - 8:
Western blot - Anti-SARS-CoV-2 nsp13 antibody [EPR24838-18] (ab286909) at 1/1000 dilution

Lanes 1 and 5:
Recombinant SARS-CoV-2 nsp13 protein (His-tagged) at 0.5 µg

Lanes 2 and 6:
Recombinant SARS-CoV-2 nsp13 protein (His-tagged) at 0.2 µg

Lanes 3 and 7:
Recombinant SARS-CoV2 nsp1 protein (His tagged) at 0.5 µg

Lanes 4 and 8:
Recombinant SARS-CoV2 nsp1 protein (His tagged) at 0.2 µg

Secondary

Lanes 1 - 4:
Western blot - Goat anti-Mouse IgG H&L (IRDye® 680RD) preadsorbed (ab216776) at 1/20000 dilution

Lanes 5 - 8:
Western blot - Goat anti-Rabbit IgG H&L (IRDye® 800CW) preadsorbed (ab216773) at 1/20000 dilution

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