abcam

ab302617

Anti-cGAS antibody [EPR26492-84]

Anti-cGAS antibody [EPR26492-84] (ab302617) is a rabbit monoclonal antibody detecting cGAS in **Western Blot, Flow Cytometry (Intra), ICC/IF**. Suitable for **Human**.

- Biophysical QC for unrivalled batch-batch consistency

Recombinant | RabMAb | 20ul selling size

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	EPR26492-84
Purification technique	Affinity purification Protein A
Concentration	0.518 mg/mL The concentration of this product may be batch-dependent Batch concentration finder →

Reactivity data

IP

Not recommended

Species	Human, Rat, Mouse
Dilution info	-

Notes	-

Flow Cyt (Intra)

Tested

Species	Human
Dilution info	1/500
Notes	-

Not recommended

Species	Rat, Mouse
Dilution info	-
Notes	-

ICC/IF

Tested

Species	Human
Dilution info	1/50
Notes	-

Not recommended

Species	Rat, Mouse
Dilution info	-
Notes	-

IHC-P

Not recommended

Species	Rat, Mouse, Human
Dilution info	-
Notes	-

WB

Tested

Species	Human
Dilution info	1/1000
Notes	-

Not recommended

Species	Rat, Mouse
Dilution info	-
Notes	-

Target data

See full target information CGAS

Function

Nucleotidyltransferase that catalyzes the formation of cyclic GMP-AMP (2',3'-cGAMP) from ATP and GTP and plays a key role in innate immunity (PubMed:21478870, PubMed:23258413, PubMed:23707061, PubMed:23707065, PubMed:23722159, PubMed:24077100, PubMed:24116191, PubMed:24462292, PubMed:25131990, PubMed:26300263, PubMed:29976794, PubMed:30799039, PubMed:31142647, PubMed:32814054, PubMed:33273464, PubMed:33542149, PubMed:37217469, PubMed:37802025). Catalysis involves both the formation of a 2',5' phosphodiester linkage at the GpA step and the formation of a 3',5' phosphodiester linkage at the ApG step, producing c[G(2',5')pA(3',5')p] (PubMed:28214358, PubMed:28363908). Acts as a key DNA sensor: directly binds double-stranded DNA (dsDNA), inducing the formation of liquid-like droplets in which CGAS is activated, leading to synthesis of 2',3'-cGAMP, a second messenger that binds to and activates STING1, thereby triggering type-I interferon production (PubMed:28314590, PubMed:28363908, PubMed:29976794, PubMed:32817552, PubMed:33230297, PubMed:33606975, PubMed:35322803, PubMed:35438208, PubMed:35460603, PubMed:35503863). Preferentially recognizes and binds curved long dsDNAs of a minimal length of 40 bp (PubMed:30007416). Acts as a key foreign DNA sensor, the presence of double-stranded DNA (dsDNA) in the cytoplasm being a danger signal that triggers the immune responses (PubMed:28363908). Has antiviral activity by sensing the presence of dsDNA from DNA viruses in the cytoplasm (PubMed:28363908, PubMed:35613581). Also acts as an innate immune sensor of infection by retroviruses, such as HIV-2, by detecting the presence of reverse-transcribed DNA in the cytosol (PubMed:23929945, PubMed:24269171, PubMed:30270045, PubMed:32852081). In contrast, HIV-1 is poorly sensed by CGAS, due to its capsid that cloaks viral DNA from CGAS detection (PubMed:24269171, PubMed:30270045, PubMed:32852081). Detection of retroviral reverse-transcribed DNA in the cytosol may be indirect and be mediated via interaction with PQBP1, which directly binds reverse-transcribed retroviral DNA

(PubMed:26046437). Also detects the presence of DNA from bacteria, such as M.tuberculosis (PubMed:26048138). 2',3'-cGAMP can be transferred from producing cells to neighboring cells through gap junctions, leading to promote STING1 activation and convey immune response to connecting cells (PubMed:24077100, PubMed:31992625). 2',3'-cGAMP can also be transferred between cells by virtue of packaging within viral particles contributing to IFN-induction in newly infected cells in a cGAS-independent but STING1-dependent manner (PubMed:26229115). Also senses the presence of neutrophil extracellular traps (NETs) that are translocated to the cytosol following phagocytosis, leading to synthesis of 2',3'-cGAMP (PubMed:33688080). In addition to foreign DNA, can also be activated by endogenous nuclear or mitochondrial DNA (PubMed:28738408, PubMed:28759889, PubMed:31299200, PubMed:33031745, PubMed:33230297). When self-DNA leaks into the cytosol during cellular stress (such as mitochondrial stress, SARS-CoV-2 infection causing severe COVID-19 disease, DNA damage, mitotic arrest or senescence), or is present in form of cytosolic micronuclei, CGAS is activated leading to a state of sterile inflammation (PubMed:28738408, PubMed:28759889, PubMed:31299200, PubMed:33031745, PubMed:33230297, PubMed:35045565). Acts as a regulator of cellular senescence by binding to cytosolic chromatin fragments that are present in senescent cells, leading to trigger type-I interferon production via STING1 and promote cellular senescence (By similarity). Also involved in the inflammatory response to genome instability and double-stranded DNA breaks: acts by localizing to micronuclei arising from genome instability (PubMed:28738408, PubMed:28759889). Micronuclei, which are frequently found in cancer cells, consist of chromatin surrounded by their own nuclear membrane: following breakdown of the micronuclear envelope, a process associated with chromothripsis, CGAS binds self-DNA exposed to the cytosol, leading to 2',3'-cGAMP synthesis and subsequent activation of STING1 and type-I interferon production (PubMed:28738408, PubMed:28759889). Activated in response to prolonged mitotic arrest, promoting mitotic cell death (PubMed:31299200). In a healthy cell, CGAS is however kept inactive even in cellular events that directly expose it to self-DNA, such as mitosis, when cGAS associates with chromatin directly after nuclear envelope breakdown or remains in the form of postmitotic persistent nuclear cGAS pools bound to chromatin (PubMed:31299200, PubMed:33542149). Nuclear CGAS is inactivated by chromatin via direct interaction with nucleosomes, which block CGAS from DNA binding and thus prevent CGAS-induced autoimmunity (PubMed:31299200, PubMed:32911482, PubMed:32912999, PubMed:33051594, PubMed:33542149). Also acts as a suppressor of DNA repair in response to DNA damage: inhibits homologous recombination repair by interacting with PARP1, the CGAS-PARP1 interaction leading to impede the formation of the PARP1-TIMELESS complex (PubMed:30356214, PubMed:31544964). In addition to DNA, also sense translation stress: in response to translation stress, translocates to the cytosol and associates with collided ribosomes, promoting its activation and triggering type-I interferon production (PubMed:34111399). In contrast to other mammals, human CGAS displays species-specific mechanisms of DNA recognition and produces less 2',3'-cGAMP, allowing a more fine-tuned response to pathogens (PubMed:30007416).

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

What is this antibody validated in?
Anti-cGAS antibody [EPR26492-84] (ab302617) is a rabbit recombinant monoclonal antibody and is validated for use in Western Blot (WB), Flow Cytometry (Intra), Immunocytochemistry/immunofluorescence (ICC/IF) in Human samples.

What is the molecular weight of cGAS?
Anti-cGAS [EPR26492-84] (ab302617) specifically detects a band for cGAS (UniProt: Q8N884) at a molecular weight of 59kDa.

Other related products
We have a range of other formats of antibody clone [EPR26492-84] also available for your convenience: ab302617, Carrier free - ab302618

Want a custom formulation?
This antibody clone is manufactured by Abcam. If you require a custom buffer formulation or conjugation for your experiments, please contact orders@abcam.com

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.

Trial sizes available!
Test your antibody or perform pre-screening before committing to a larger quantity. Sold in 20µl. Discover our selection of trial-size antibodies.

Supplementary info

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

Activity summary	The cyclic GMP-AMP synthase commonly referred to as cGAS functions as an enzyme that detects cytosolic DNA. It has a molecular weight of 50 kDa. This protein is widely expressed in various cell types with high expression in cells exposed to foreign DNA such as immune cells. cGAS acts by binding to cytosolic DNA which leads to the production of the secondary messenger cyclic GMP-AMP (cGAMP). This action is critical for initiating innate immune responses against viral infections and cellular stress.
Biological function summary	CGAS plays a fundamental role in the immune response by activating the STING pathway. cGAS when bound to DNA forms a complex with DNA as part of its mechanistic function which then catalyzes the synthesis of cGAMP. The cGAMP produced acts as a signaling molecule that activates the STING protein leading to subsequent immune signaling cascades. This activation results in the production of type I interferons and other inflammatory cytokines essential for mounting an effective antiviral response.
Pathways	CGAS operates within important signaling pathways such as the cGAS-STING pathway and the type I interferon pathway. This protein works closely with STING located on the endoplasmic reticulum as a direct effector. The connection between cGAS and STING is important in detecting and responding to cytosolic DNA and initiating immune signaling leading to activation of downstream transcription factors like IRF3 and NF-kB which promote gene expression driving immune responses.
Associated diseases and disorders	CGAS links to autoimmune diseases and cancer. Aberrant cGAS activity can lead to inappropriate immune activation contributing to autoimmune disorders such as lupus where the body attacks its own cells. In the case of cancer cGAS can play dual roles either promoting an immune response against tumors or contributing to an environment where cancer can evade immune detection. The relation between cGAS and diseases also involves STING as disruptions in this pathway can lead to alterations in immune surveillance and inflammation.

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

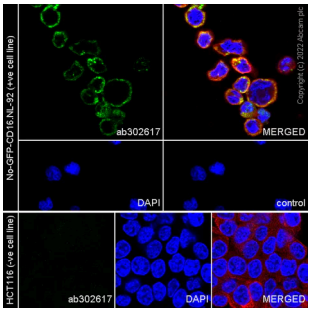
We do not recommend this combination. It is not covered by our product promise.

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.

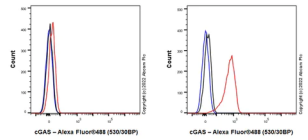
Full details and terms and conditions can be found here:
Terms & Conditions.

8 product images



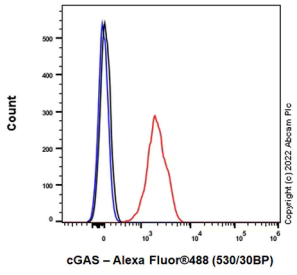
Immunocytochemistry/ Immunofluorescence - Anti-cGAS antibody [EPR26492-84] (ab302617)

Immunofluorescent analysis of 4% Paraformaldehyde-fixed, 0.1% TritonX-100 permeabilized No-GFP-CD16.NK-92 (human lymphoblast natural killer cell; nk cell) cells labelling cGAS with ab302617 at 1/50 (10.0 ug/ml) dilution, followed by ab150081 Goat Anti-Rabbit IgG H&L (Alexa Fluor® 488) preadsorbed antibody at 1/1000 2ug/mL dilution (Green). Confocal image showing cytoplasmic and membranous staining in No-GFP-CD16.NK-92 cell lineNegative control: HCT 116 (PMID: 33790360) is observed. was used to counterstain tubulin at 1/200 2.5 dilution (Red). The Nuclear counterstain was DAPI (Blue). Secondary antibody only control: Secondary antibody is ab150081 Goat Anti-Rabbit IgG H&L (Alexa Fluor® 488) preadsorbed at 1/1000 2ug/mL dilution.



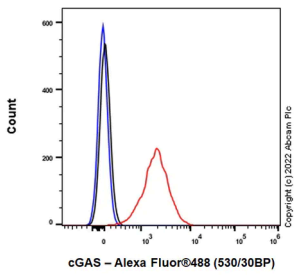
Flow Cytometry (Intracellular) - Anti-cGAS antibody [EPR26492-84] (ab302617)

Flow cytometric analysis of 4% paraformaldehyde fixed 90% methanol permeabilized HCT 116 (human colorectal carcinoma epithelial cell, Left) / No-GFP-CD16.NK-92 (human malignant non-Hodgkin's lymphoma natural killer cell, Right) cells labelling cGAS with ab302617 at 1/500 dilution (0.1ug) (Red) (Red) compared with a Rabbit monoclonal IgG (ab172730) (Black) isotype control and an unlabelled control (cells without incubation with primary antibody and secondary antibody) (Blue). A Goat Anti-Rabbit IgG (Alexa Fluor® 488, ab150081) at 1/2000 dilution was used as the secondary antibody. Negative control: HCT 116 (PMID: 33790360)



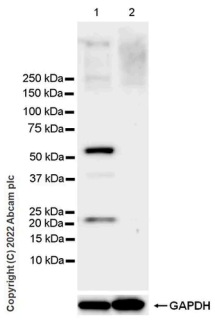
Flow Cytometry (Intracellular) - Anti-cGAS antibody [EPR26492-84] (ab302617)

Flow cytometric analysis of 4% paraformaldehyde fixed 90% methanol permeabilized HT-29 (Human colorectal adenocarcinoma epithelial cell) cells labelling cGAS with ab302617 at 1/500 dilution (0.1ug) (Red) (Red) compared with a Rabbit monoclonal IgG (ab172730) (Black) isotype control and an unlabelled control (cells without incubation with primary antibody and secondary antibody) (Blue). A Goat Anti-Rabbit IgG (Alexa Fluor® 488, ab150081) at 1/2000 dilution was used as the secondary antibody.



Flow Cytometry (Intracellular) - Anti-cGAS antibody [EPR26492-84] (ab302617)

Flow cytometric analysis of 4% paraformaldehyde fixed 90% methanol permeabilized MCF7 (human breast adenocarcinoma epithelial cell) cells labelling cGAS with ab302617 at 1/500 dilution (0.1ug) (Red) (Red) compared with a Rabbit monoclonal IgG (ab172730) (Black) isotype control and an unlabelled control (cells without incubation with primary antibody and secondary antibody) (Blue). A Goat Anti-Rabbit IgG (Alexa Fluor® 488, ab150081) at 1/2000 dilution was used as the secondary antibody.



Western blot - Anti-cGAS antibody [EPR26492-84] (ab302617)

Blocking and diluting buffer and concentration: 5% NFDM/TBST Negative control: HCT 116 (PMID: 33790360) HT-29 lysate was freshly made and used for Western blotting immediately to minimize protein degradation. The bands between 40 kDa and 23 kDa are likely to be degraded target fragments. Exposure time: 26 seconds
All lanes:
Western blot - Anti-cGAS antibody [EPR26492-84] (ab302617) at 1/1000 dilution

Lane 1:
HT-29 (human colorectal adenocarcinoma epithelial cell), whole cell lysate 20 µg

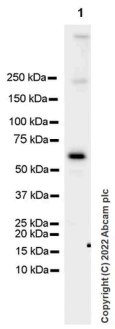
Lane 2:
HCT 116 (human colorectal carcinoma epithelial cell), whole cell lysate 20 µg

Secondary

All lanes:
Western blot - Goat Anti-Rabbit IgG H&L (HRP) (ab97051) at 1/20000 dilution

Observed band size: 62 kDa

Exposure time: 26s



Western blot - Anti-cGAS antibody [EPR26492-84] (ab302617)

Blocking and diluting buffer and concentration: 5% NFDM/TBST Lysate was freshly made and used for Western blotting immediately to minimize protein degradation. The identity of the bands above 250 kDa are unknown. Exposure time: 37 seconds
All lanes:
Western blot - Anti-cGAS antibody [EPR26492-84] (ab302617) at 1/1000 dilution

All lanes:
Hela (human cervix adenocarcinoma epithelial cell), whole cell lysate 20 µg

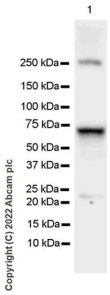
Secondary

All lanes:
Western blot - Goat Anti-Rabbit IgG H&L (HRP) (ab97051) at 1/50000 dilution

Observed band size: 62 kDa

Exposure time: 37s

Western blot - Anti-cGAS antibody [EPR26492-84] (ab302617)



Blocking and diluting buffer and concentration: 5% NFDM/TBST Lysate was freshly made and used for Western blotting immediately to minimize protein degradation. The identity of the higher MW band at approximately 250 kDa is unknown. Exposure time: 15 seconds
All lanes:
Western blot - Anti-cGAS antibody [EPR26492-84] (ab302617) at 1/1000 dilution

All lanes:
No-GFP-CD16.NK-92 (human malignant non-Hodgkins lymphoma natural killer cell), whole cell lysate 20 µg

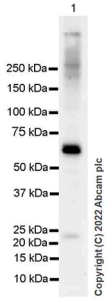
Secondary

All lanes:
Western blot - Goat Anti-Rabbit IgG H&L (HRP) (ab97051) at 1/50000 dilution

Observed band size: 62 kDa

Exposure time: 15s

Western blot - Anti-cGAS antibody [EPR26492-84] (ab302617)



Blocking and diluting buffer and concentration: 5% NFDM/TBST Lysate was freshly made and used for Western blotting immediately to minimize protein degradation. The band beneath the target band (23 kDa) is likely to be degraded target fragment. Exposure time: 59 seconds
All lanes:
Western blot - Anti-cGAS antibody [EPR26492-84] (ab302617) at 1/1000 dilution

All lanes:
MCF-7 (human breast adenocarcinoma epithelial cell), whole cell lysate 20 µg

Secondary

All lanes:
Western blot - Goat Anti-Rabbit IgG H&L (HRP) (ab97051) at 1/20000 dilution

Observed band size: 62 kDa

Exposure time: 59s

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