Recombinant Human CGAS Protein (D157-F522), His/MBP; Flag tagged

Cat. No. CGAS-0782H **Lot. No.** (See product label)

SPECIFICATION

Product Overview	Recombinant Human 6His-MBP-TEV-MB21D1(D157-F522 end)-Flag Protein was expressed in E. coli.
Species	Human
Source	E.coli
ProteinLength	D157-F522
Description	Nucleotidyltransferase that catalyzes the formation of cyclic GMP-AMP (2',3'-cGAMP) from ATP and GTP and plays a key role in innate immunity. 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]. 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. Preferentially recognizes and binds curved long dsDNAs of a minimal length of 40 bp. 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. Has antiviral activity by sensing the presence of dsDNA from DNA viruses in the cytoplasm. 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. In contrast, HIV-1 is poorly sensed by CGAS, due to its capsid that cloaks

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viral DNA from CGAS detection. 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. Also detects the presence of DNA from bacteria, such as M.tuberculosis. 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. 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. Also senses the presence of neutrophil extracellular traps (NETs) that are translocated to the cytosol following phagocytosis, leading to synthesis of 2',3'-cGAMP. In addition to foreign DNA, can also be activated by endogenous nuclear or mitochondrial DNA. When self-DNA leaks into the cytosol during cellular stress (such as mitochondrial stress, DNA damage, mitotic arrest or senescence), or is present in form of cytosolic micronuclei, CGAS is activated leading to a state of sterile inflammation. 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. Also involved in the inflammatory response to genome instability and double-stranded DNA breaks: acts by localizing to micronuclei arising from genome instability. 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. Activated in response to prolonged mitotic arrest, promoting mitotic cell death. 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. Nuclear CGAS is inactivated by chromatin via direct interaction with nucleosomes, which block CGAS from DNA binding and thus prevent CGAS-induced autoimmunity. 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. 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. 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.
Form	Liquid
Endotoxin	< 0.01 EU per μg of the protein
Purity	90%
Stability	Samples are stable for up to twelve months from date of receipt at -20 to -80 centigrade.
Storage	Store it under sterile conditions at -20 to -80 centigrade. It is recommended that the protein be aliquoted for optimal storage. Avoid repeated freeze-thaw cycles.
Storage Buffer	Supplied as sterile 50mM Tris-HCl (pH 7.5), 200mM NaCl, 20% glycerol
Shipping	It is shipped out with blue ice.

GENE INFORMATION

Gene Name	CGAS cyclic GMP-AMP synthase [Homo sapiens (human)]
Official Symbol	CGAS
Synonyms	CGAS; cyclic GMP-AMP synthase; MB21D1; h-cGAS; C6orf150; cyclic GMP-AMP

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	synthase; 2'3'-cGAMP synthase; Mab-21 domain containing 1; cGAMP synthase; mab-21 domain-containing protein 1; protein MB21D1; EC 2.7.7.86
Gene ID	115004
mRNA Refseq	NM_138441
Protein Refseq	NP_612450
MIM	613973
UniProt ID	Q8N884

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