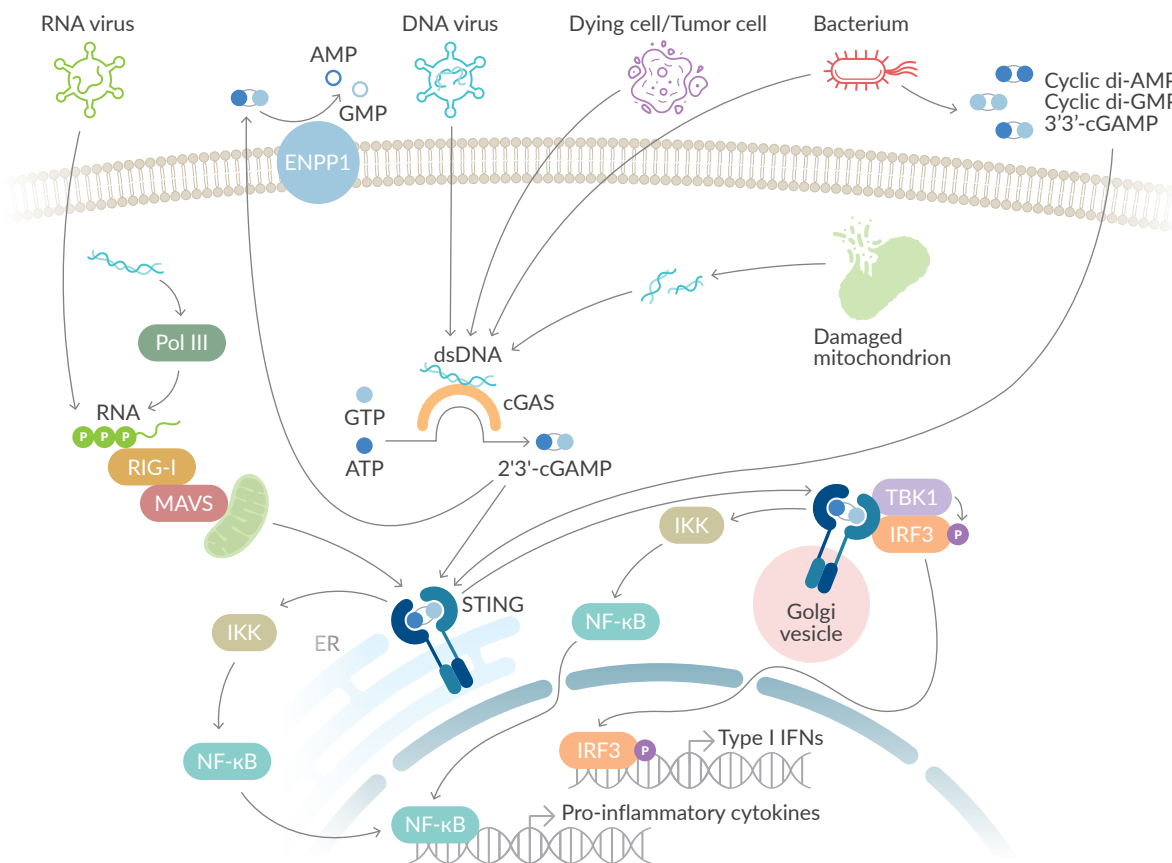


STING Signaling Pathway

STimulator of INTERferon Genes and the innate immune response

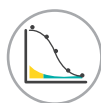


Cayman offers a dedicated tool set to study STING, a central mediator of the innate immune response that induces the expression of various interferons, cytokines, and T cell recruitment factors and has the potential to enhance the initial anticancer response. Products include cyclic dinucleotides (CDNs), recombinant STING variants, ELISA kits, agonists, inhibitors, and additional key pattern recognition receptor proteins and antibodies to study this area of therapeutic interest. *In silico* modeling and SPR analysis services are available to help identify novel STING modulators.



The mammalian cytosolic DNA sensor cGAS signals through the adaptor protein STING. STING is also a direct sensor of bacterial and mammalian CDNs. Irrespective of cell type or DNA sequence, activation of STING through the cGAS-cGAMP-STING signaling pathway is essential for DNA-mediated immune responses. Hydrolysis of extracellular cGAMP by ENPP1 attenuates cGAS-STING signaling. The cytosolic RNA sensor RIG-I signals through the adaptor protein MAVS to trigger signaling cascades common to STING that lead to the production of type I IFNs and pro-inflammatory cytokines.

Discover Cayman's STING Research Tools INSIDE!



High-sensitivity Assays

Cyclic Dinucleotide ELISA Kits



Well-characterized Proteins

cGAS, STING Variants, & More



Wide Range of Biochemicals

Small Molecule Agonists & Antagonists



High Quality & Specific Antibodies

cGAS, STING, TBK1, IRF3, MAVS, & More

Cytosolic Nucleic Acid Sensing

Specific families of pattern recognition receptors are responsible for detecting DNA or RNA from invading microbes or host cells and generating innate immune responses. Cayman has developed tools to study this process that leads to activation of the type I IFN and NF- κ B pathways.

Cytosolic DNA Sensor

Item No.	Product Name
22810	cGAS (human, recombinant)
23853	cGAS Monoclonal Antibody (Clone 5G10)

Cytosolic RNA Sensor & Adaptor Protein

Item No.	Product Name
25620	RIG-I helicase domain (human, recombinant)
25300	RIG-I Monoclonal Antibody (Clone 1E3)
26355	MAVS Monoclonal Antibody (Clone 7B9)

CDNs & Negative Controls

Item No.	Product Name
17753	Cyclic di-AMP (sodium salt)
17144	Cyclic di-GMP (sodium salt)
22485	Cyclic di-IMP (sodium salt)
33890	Cyclic di-UMP (sodium salt)
22419	2'2'-cGAMP (sodium salt)
19887	2'3'-cGAMP (sodium salt)
17966	3'3'-cGAMP (sodium salt)
33886	5'-pApA (sodium salt)
33889	5'-pGpG (sodium salt)

Tools to Study cGAS Activity

Cayman offers robust, easy-to-use assays to screen modulators of human cGAS. Active cGAS enzyme, substrates, and positive control inhibitor are provided to screen for inhibitors.

cGAS Inhibitor Screening Assay Kit

Item No. 701930

Uses a competitive ELISA platform to directly measure 2'3'-cGAMP as an indicator of cGAS activity

cGAS TR-FRET Inhibitor Screening Assay Kit

Item No. 702120

Uses a homogenous TR-FRET platform compatible with high-throughput screening applications



Learn more about our assays to study cGAS activity and screen for inhibitors at www.caymanchem.com/cGASassays

cGAS Inhibitors

Item No.	Product Name
31029	CU-32
31030	CU-76
28318	G150
32515	PF-06928215
31765	RU-521

Sensitive, Accurate Quantification of Cyclic Dinucleotides

Cayman, in collaboration with Biolog Life Science Institute, has developed competitive immunoassays for specific detection of 2'3'-cGAMP, 3'3'-cGAMP, cyclic di-GMP, and cyclic di-AMP. By monitoring CDN levels in biological samples, these assays can be used to identify compounds that modulate CDN synthesis, degradation, & signaling.

- **Highly Sensitive:** Detection in the low pg/ml range
- **Reliable:** Validated in THP-1 or *E. coli* cell lysates

2'3'-cGAMP ELISA Kit

Item No. 501700

Measure 2'3'-cGAMP in mammalian cell lysates, plasma, serum, and tissue samples

3'3'-cGAMP ELISA Kit

Item No. 502130

Measure 3'3'-cGAMP in bacterial and mammalian cell lysates and cell supernatants

Cyclic di-GMP ELISA Kit

Item No. 501780

Measure cyclic di-GMP in bacterial cell lysates

Cyclic di-AMP ELISA Kit

Item No. 501960

Measure cyclic di-AMP in bacterial cell lysates

STING Regulation

STING binds to CDNs, activating signals that stimulate IFN genes. Cayman offers variants of the STING proteins that occur as natural haplotypes or introduce point mutations within the CDN binding domain as well as antibodies and synthetic agonists and antagonists to help understand the events that lead to IFN induction.

STING Variants & Antibodies

Item No.	Product Name
25306	STING A162 variant (human, recombinant)
23592	STING AQ variant (human, recombinant)
22815	STING H232 variant (human, recombinant)
15139	STING H232 variant; SUMO-tagged (human, recombinant)
23594	STING M284 variant (human, recombinant)
23593	STING R224 variant (human, recombinant)
22816	STING R232 variant (human, recombinant)
25923	STING (C-Term) Monoclonal Antibody (Clone 1B10)
25922	STING M284 variant Monoclonal Antibody (Clone 8E7)
24791	STING M284 variant Polyclonal Antibody
17856	STING Monoclonal Antibody (Clone 2C8)
17857	STING Polyclonal Antibody

Read more about genetic variations in human STING that affect CDN binding and STING activation at www.caymanchem.com/STINGvariants

STING Agonists

Item No.	Product Name
30022	CAY10748
28054	diABZI STING Agonist-1 (hydrochloride)
34088	diABZI STING Agonist-2
34082	diABZI STING Agonist-3
14617	DMXAA
35454	M04
24106	ML RR-S2 CDA (ammonium salt)
30140	MSA-2
31759	SR 717 (lithium salt)

See all STING agonists at www.caymanchem.com

STING Antagonists

Item No.	Product Name
30157	C-170
30159	C-171
25859	C-176
25860	C-178
25857	H-151
34890	SN-011
28319	STING18

Tools to Study ENPP1 Activity

Ectonucleotide pyrophosphatase/phosphodiesterase 1 (ENPP1) degrades extracellular 2'3'-cGAMP to prevent STING activation in nearby cells and is upregulated in several types of cancer.

ENPP1 Fluorescent Inhibitor Screening Assay Kit

Item No. 702090

- A convenient fluorometric method of screening human ENPP1 modulators
- Active ENPP1 enzyme, substrate, and positive control inhibitor are provided to screen for inhibitors

ENPP1 Protein & Inhibitors

Item No.	Product Name
33397	ENPP1 (human, recombinant)
29865	CAY10761
29864	3,3'-((2-Chlorophenyl)methylene)bis(4-hydroxy-2H-chromen-2-one)
31764	ENPP1-IN-1
29809	ENPP1 Inhibitor C

See all ENPP1 inhibitors at www.caymanchem.com



Read our News article to learn more about how ENPP1 suppresses immune responses in the tumor microenvironment.

www.caymanchem.com/ENPP1

IDENTIFY NOVEL hSTING AGONISTS/ANTAGONISTS

Our experts offer computer-aided drug design (CADD) to virtually screen compounds using Schrödinger software and further characterization of hSTING agonists via SPR analysis.

Download our scientific poster to learn more at www.caymanchem.com/hSTINGagonists

Host Immune Response

Phosphorylation of the transcription factor IRF3 by the IKK-related kinase TBK1 leads to production of type I IFNs. Cayman has developed key proteins, antibodies, and chemical modulators to study the important players in this process as well as the activation of NF- κ B triggered by IKK, which controls the expression of cytokines.

Interferon Activation Proteins & Antibodies

Item No.	Product Name
22811	IRF3 (human, recombinant)
23590	IRF3 (S386A, S396A mutant; human, recombinant)
22817	TBK1 (human, recombinant)
25921	IRF3 Monoclonal Antibody (Clone 1E10)
24937	IRF3 Polyclonal Antibody
25924	TBK1 Monoclonal Antibody (Clone 4E6)

Interferon Pathway Modulators

Item No.	Product Name
17869	Dimethyl biphenyl-4,4'-dicarboxylate
30960	IFN- α -IFNAR-IN-1 (hydrochloride)
20449	RO8191
22402	StA-IFN-1

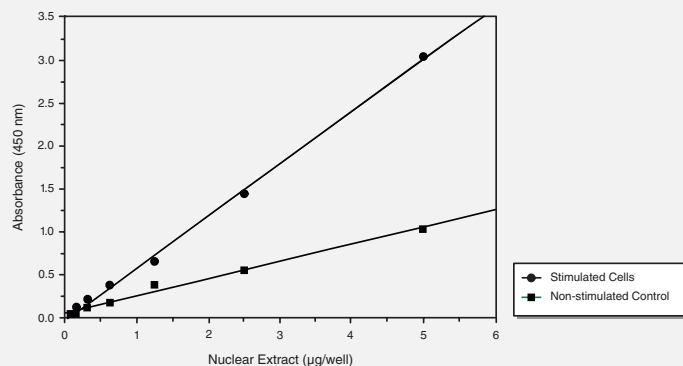
IKK Antibody & Inhibitors

Item No.	Product Name
13931	IKK γ Monoclonal Antibody (Clone 72C627)
14181	Amlexanox
19184	BI-605906
16667	BMS 345541 (hydrochloride)
10011249	CAY10576
13313	IKK-16 (hydrochloride)
17276	IKK2 Inhibitor VI
17290	IMD 0354
18774	LY2409881
14862	PS-1145
10010267	SC-514
15115	TPCA-1
11796	Wedelolactone

See all IKK and TBK1 inhibitors at www.caymanchem.com

NF- κ B Transcription Factor Assays

- Sensitive, non-radioactive method to detect human p50 or p65 NF- κ B from whole cell lysates
- Capture the transcription factor using a specific dsDNA sequence bound to the plate
- Detect the dsDNA-bound transcription factor with specific antibodies in an ELISA format
- Nuclear Extraction Kit available to aid in the isolation of nuclear and cytoplasmic fractions from cell lysates or tissue homogenates



Assay of cell lysates isolated from stimulated and non-stimulated HeLa cells demonstrating NF- κ B (p65) activity.

Item No.	Product Name
10006912	NF- κ B (human p50) Transcription Factor Assay Kit
10007889	NF- κ B (p65) Transcription Factor Assay Kit
10009277	Nuclear Extraction Kit

TNF- α /NF- κ B signaling inhibitors are available at www.caymanchem.com

Cytokine Detection Assays

Item No.	Product Name
583301	Interleukin-1 α (human) ELISA Kit
583311	Interleukin-1 β (human) ELISA Kit
501030	Interleukin-6 (human) ELISA Kit
583371	Interleukin-6 (mouse) ELISA Kit
28325	Q-Plex™ Human Cytokine - Inflammation (9-plex)
28327	Q-Plex™ Human Cytokine - Screen (16-plex)
31810	Q-Plex™ Human Cytokine Release (16-plex)
28332	Q-Plex™ Mouse Cytokine - Inflammation (14-plex)
28329	Q-Plex™ Mouse Cytokine - Screen (16-plex)

See all cytokine detection assay kits at www.caymanchem.com

View a complete list of STING Research Tools at www.caymanchem.com