cAIMP

Cyclic (adenine monophosphate- inosine monophosphate), a STING ligand

Catalog # tlrl-nacai

http://www.invivogen.com/caimp

For research use only

Version # 17I14-MM

PRODUCT INFORMATION

Content:

• 500 µg of cAIMP provided lyophilized

Note: cAIMP is sterile filtered prior to lyophilization.

• 1.5 ml endotoxin-free water

Storage and stability:

- Product is shipped at room temperature and should be stored at -20°C.
- Upon resuspension, prepare aliquots of cAIMP and store at -20°C. Resuspended product is stable for 6 months when properly stored. Avoid repeated freeze-thaw cycles.

Quality control:

- Purity and structure has been determined by LC/MS and NMR: ≥ 95%
- The biological activity of cAIMP has been confirmed using cellular assays.
- The absence of bacterial contamination (e.g. lipoproteins & endotoxins) has been confirmed using HEK-Blue™ TLR2 and HEK-Blue™ TLR4 cells.

DESCRIPTION

cAIMP is a novel STING (stimulator of interferon genes)-activating synthetic cyclic dinucleotide (CDN)[1]. It is an analog of the bacterial CDN 3'3'-cGAMP. Unlike natural CDNs, whose constituent nucleosides are guanosine and/or adenine, cAIMP contains one adenine nucleoside and one inosine nucleoside. Interestingly, when compared to the reference agonists for human (2'3'-cGAMP) and murine (DMXAA) STING, cAIMP (referred to as compound 9 by Lioux *et al.*[1]) exhibits potency similar to 2'3'-cGAMP and is more potent than DMXAA in inducing interferon regulatory factor (IRF) and NF-κB pathways in a STING-dependent manner[1].

STING ligands such as cAIMP induce the production of type I interferons (IFNs) and of proinflammatory cytokines through the IRF and NF-κB pathways, respectively. To facilitate their study, InvivoGen has developed stable reporter cells in two well established immune cell models: THP-1 human monocytes and RAW 264.7 murine macrophages. These cells express inducible SEAP and/or Lucia luciferase reporter genes under the control of an IRF-inducible and NF-κB promoter.

1. Lioux T. et al., 2016. Design, synthesis, and biological evaluation of novel cyclic adenosine-inosine monophosphate (cAIMP) analogs that activate stimulator of interferon genes (STING). J Med Chem. 59(22):10253-10267. **2. Unterholzner L. et al., 2010.** IFI16 is an innate immune sensor for intracellular DNA.Nat Immunol. 11(11):997-1004. **3. Zhang Z. et al., 2011.** The helicase DDX41 senses intracellular DNA mediated by the adaptor STING in dendritic cells. Nat Immunol.12(10):959-65. **4. Arakawa R. et al., 2010.** Characterization of LRRFIP1. Biochem Cell Biol. 88(6):899-906. **5. Lippmann J. et al., 2010.** IFN beta responses induced by intracellular bacteria or cytosolic DNA in different human cells do not require ZBP1 (DLM-1/DAI). Cell Microbiol. 10(12):2579-88.

CHEMICAL PROPERTIES

Source: Synthetic

Synonyms: 3'3'-cAIMP sodium salt, 3'3'-c(ApIp) sodium salt

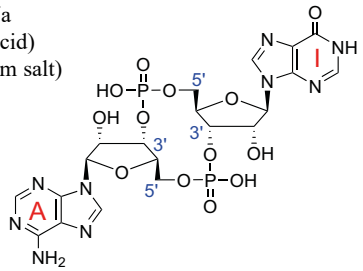
CAS number: 1507367-51-2

Formula: $C_{20}H_{23}N_9O_{13}P_2$ •2Na

Molecular weight: 659.4 (free acid)
703.4 (sodium salt)

Solubility: 50 mg/ml in water

Structure:



METHODS

Preparation of stock solution (1 mg/ml):

Stimulation of STING can be achieved with 300 ng-30 µg/ml cAIMP.

1. Briefly centrifuge the vial before opening to dislodge any lyophilized material that may be dispersed on the wall or cap of the vial. Carefully open the vial lid to avoid any loss of product.
2. Add 500 µl of endotoxin-free water to 500 µg of cAIMP.
3. Vortex until completely dissolved.

Induction of type I IFNs in THP1-Blue™ ISG cells

Induction of type I IFNs with cAIMP can be studied in a variety of cells. The human monocytic cell line THP-1 has been shown to express all the cytosolic DNA sensors[2-4], with the exception of DAI[5]. A protocol for the induction of type I IFNs using THP1-Blue™ ISG cells, an IRF-SEAP reporter cell line, is given below:

1. Resuspend cAIMP as described above.
2. Stimulate cells with 300 ng-30 µg/ml cAIMP for 16-48 hours.
3. Monitor induction of type I IFNs by measuring the levels of IRF-induced SEAP (secreted embryonic alkaline phosphatase) in the cell culture supernatant using QUANTI-Blue™, a SEAP detection reagent.

RELATED PRODUCTS

Product	Cat.Code
STING ligands	
2'3'-cGAMP	tlrl-nacga23
cAIMP Difluor	tlrl-nacaidf
cAIM(PS)$_2$ Difluor (Rp/Sp)	tlrl-nacairs
DMXAA	tlrl-dmx
STING reporter cells	
RAW-Blue™ (IRF-SEAP) ISG cells	raw-isg
THP1-Blue™ (IRF-SEAP) ISG cells	thp-isg
THP1-Dual™ (NF-κB-SEAP & IRF-Luc) cells	thpd-nfis
THP1-Dual™ KI-hSTING-A162 cells	thpd-a162
THP1-Dual™ KI-hSTING-R232 cells	thpd-r232

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