

c-di-GMP Fluorinated

Fluorinated cyclic diguanylate monophosphate: a STING ligand

Catalog code: tlr1-nacdgf-2

<https://www.invivogen.com/cdigmp-fluorinated>

For research use only. Not for use in humans.

Version 23A10-MM

PRODUCT INFORMATION

Contents

- 2 x 100 µg of lyophilized c-di-GMP Fluorinated

Note: c-di-GMP Fluorinated is sterile filtered prior to lyophilization.

- 2 x 1.5 ml endotoxin-free water

Storage and stability

- c-di-GMP Fluorinated is shipped at room temperature and should be stored at -20°C.

- Upon resuspension, prepare aliquots of c-di-GMP Fluorinated 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 ability of c-di-GMP Fluorinated to induce type I interferon (IFN) has been confirmed using cellular assays.
- The absence of bacterial contamination (e.g. lipoproteins and endotoxins) has been confirmed using HEK-Blue™ TLR2 and HEK-Blue™ TLR4 cells.

DESCRIPTION

c-di-GMP Fluorinated (c-di-[2'FdGMP]) is a synthetic analog of cyclic diguanylate monophosphate (c-di-GMP), a bacterial second messenger that is a potent immunostimulant in mammals. It induces production of type I interferons (IFNs) by directly binding to the endoplasmic reticulum-resident receptor STING (stimulator of interferon genes)¹. c-di-GMP Fluorinated is composed of two 2'-deoxyguanosines with a fluorine atom at 2' position of each nucleoside.

The incorporation of fluorine into biologically active molecules is commonly used in medicinal chemistry to improve their metabolic stability or to modulate physicochemical properties such as lipophilicity^{2,3}. Moreover, the introduction of a fluorine atom can change the biological activities of a molecule. Interestingly, when used at low concentrations in various cellular assays, c-di-GMP Fluorinated induces higher levels of type I IFNs than does c-di-GMP.

STING ligands such as c-di-GMP induce type I IFNs and activate interferon stimulated genes (ISG) through interferon regulatory factors (IRFs). 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 a reporter gene (SEAP or Lucia luciferase), under control of an IRF-inducible promoter.

1. Burdette DL. et al., 2011. STING is a direct innate immune sensor of cyclic di-GMP. *Nature*. 478(7370):515-8. **2. Liu P. et al., 2008.** Fluorinated Nucleosides: Synthesis and biological implication. *J Fluor Chem*. 129(9): 743-766. **3. Böhm HJ. et al., 2004.** Fluorine in medicinal chemistry. *Chembiochem*. 5(5):637-434. **Unterholzner L. et al., 2010.** IFI16 is an innate immune sensor for intracellular DNA. *Nat Immunol*. 11(11):997-1004. **5. 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. **6. Arakawa R. et al., 2010.** Characterization of LRRFIP1. *Biochem Cell Biol*. 88(6):899-906. **7. Lippmann J. et al., 2010.** IFNβ 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

Synonym: 2'Fluoro-c-di-dGMP sodium salt, c-di(2'FdGMP)

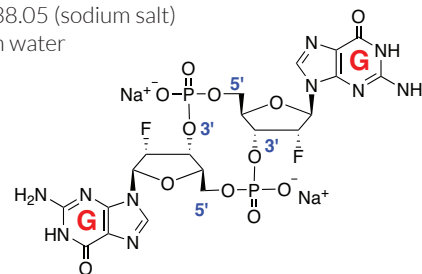
CAS number: 1334145-18-4

Formula: C₂₀H₂₀F₂N₁₀O₁₂P₂ • 2Na

Molecular weight: 694.40 (free acid)
738.05 (sodium salt)

Solubility: 50 mg/ml in water

Structure:



METHODS

Preparation of stock solution (100 µg/ml)

Stimulation of STING can be achieved with 3-100 µg/ml c-di-GMP Fluorinated.

- Add 1 ml of endotoxin-free water to 100 µg of c-di-GMP Fluorinated.
- Mix the solution by pipetting up and down.

Induction of type I IFNs in THP1-Lucia ISG cells

Induction of type I IFNs with c-di-GMP Fluorinated 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^{4,5}, with the exception of DAI⁷. A protocol for the induction of type I IFNs using THP1-Lucia™ ISG cells, an IRF-luciferase reporter cell line, is given below:

- Resuspend c-di-GMP Fluorinated, as described above.
- Stimulate cells with 3-100 µg/ml c-di-GMP Fluorinated for 16-48 h.
- Monitor induction of type I IFNs by measuring the levels of IRF-induced Lucia luciferase in the cell culture supernatant using QUANTI-Luc™, a Lucia luciferase detection reagent.

RELATED PRODUCTS

Product	Catalog Code
3'3'-cGAMP	tlrl-nacga
c-di-AMP	tlrl-nacda
c-di-AMP Fluorinated	tlrl-nacdaf-2
c-di-GMP	tlrl-nacdg
RAW-Lucia™ (IRF-Lucia luciferase) ISG cells	rawl-isg
RAW-Lucia™ ISG-KO-STING cells	rawl-kostg
THP1-Dual™ (NF-κB-SEAP & IRF-Luc) cells	thpd-nfis
THP1-Dual™ KO-STING cells	thpl-kostg
THP1-Dual™ KI-hSTING-A162 cells	thpd-a162
THP1-Dual™ KI-hSTING-R232 cells	thpd-r232

TECHNICAL SUPPORT

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