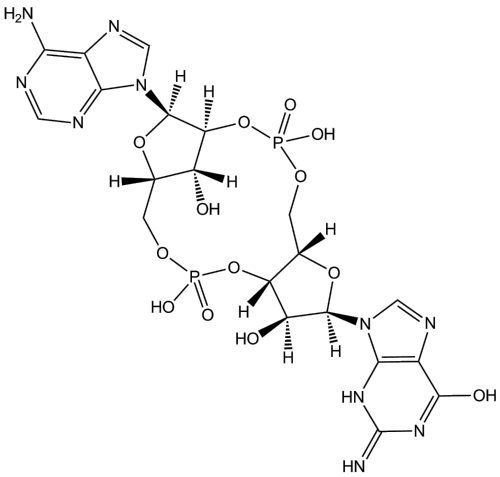
Product Data Sheet

Product Name: 2',3'-cGAMP
Cat. No.: GC19989

Chemical Properties

Cas. No.	1441190-66-4		
Formula	$C_{20}H_{24}N_{10}O_{13}P_2$	M.Wt	674.41
Solubility	Water : 5 mg/mL (7.41 mM; ultrasonic and warming and heat to 60°C)	Storage	-20°C, sealed storage, away from moisture
General tips	For obtaining a higher solubility , please warm the tube at 37 °C and shake it in the ultrasonic bath for a while.Stock solution can be stored below -20°C for several months.		
Shipping Condition	Evaluation sample solution : ship with blue ice All other available size: ship with RT , or blue ice upon request.		
Structure			

Protocol

Cell experiment [1]:	
Cell lines	PC3 cell

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Preparation method	Cell toxicity was measured using the method of MTT. After 24 hours of incubation, cells were exposed to docetaxel for 48 hours at concentrations of 2.2, 4.4, 8.75, 17.5 and 35 μM 2',3'-cGAMP. After 48h incubation, the cell suspension was washed with PBS.
Reaction Conditions	2.2, 4.4, 8.75, 17.5 and 35 μM; 48h
Applications	The 2',3'-cGAMP has cytotoxic effects, IC_{50} was 11.46 μM.
Animal experiment [2]:	
Animal models	C57 BL/6 mice
Preparation method	After melanoma cell inoculation, C57 BL/6 mice were treated with 3 μg, 10 μg of 2′3′-cGAMP or 200 μg of PD-L1 antibody on days 4, 8 and 12 respectively (n = 4-5 in each group). A total of 50 μL of 2′3′-cGAMP in PBS at the indicated concentrations was injected into the muscles of the hind legs, and the tumor volume was measured.
Dosage form	3 μg/10 μg；4, 8 and 12days；i.m.
Applications	10 μg of 2',3'-cGAMP was as effective as 200 μg of the PD-L1 antibody, and the combination treatment was even more effective. Titration experiment showed that 2',3'-cGAMP enhanced the antitumor effects of PD-L1 antibody in a dose-dependent manner.

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References:

[1] Rezaei M .09-P53. Docetaxel Enhances the Expression of STING Protein in PC3 Prostate Cancer Cells, and cGAMP Attenuates This Effect[C]. Benchmarking an Artificial Intelligence Method for Fast Diagnosis of Rare Genetic Disease.2020.

[2] Wang, H. et al. cGAS is essential for the antitumor effect of immune checkpoint blockade. Proc. Natl Acad. Sci. USA 114, 1637–1642 (2017).

Background

2',3'-cGAMP is a specific agonist of the STING receptor, and its mechanism of action primarily involves activating the STING signaling pathway, promoting the production of interferons and inflammatory cytokines. 2',3'-cGAMP plays an important role in the innate immune pathway of mammals, responsible for the surveillance of cytoplasmic DNA. The K_d value of 2',3'-cGAMP binding to STING is 3.79 nM[1]. 2',3'-cGAMP is commonly used in research on immune regulation, antiviral immunity, and cancer treatment.

In vitro, 2',3'-cGAMP (2.2, 4.4, 8.75, 17, 35 μM) treatment of PC 3 cells for 48 hours has an IC_{50} value of 11.46 μM[2]. Treating the PC 3 cell line with 2',3'-cGAMP (4 μg/ml) for 10 minutes activates STING[3].

In vivo, 10 μg of 2',3'-cGAMP is as effective as 200 μg of PD-L1 antibody in combating melanoma in C57 BL/6 mice. Titration experiments show that 2',3'-cGAMP enhances the antitumor effect of the PD-L1 antibody in a dose-dependent manner[4].

References:

[1] Zhang X, et al. Cyclic GMP-AMP containing mixed phosphodiester linkages is an endogenous high-affinity ligand for STING. Mol Cell. 2013 Jul 25;51(2):226-35.

[2] Rezaei M .09-P53. Docetaxel Enhances the Expression of STING Protein in PC3 Prostate Cancer Cells, and cGAMP Attenuates This Effect[C]. Benchmarking an Artificial Intelligence Method for Fast Diagnosis of Rare Genetic Disease.2020.

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[3] Hannes S , Karlowitz R , Wijk S J L V .The Smac mimetic BV6 cooperates with STING to induce necroptosis in apoptosis-resistant pancreatic carcinoma cells[J].Cell Death & Disease.2024.

[4] Wang, H. et al. cGAS is essential for the antitumor effect of immune checkpoint blockade. Proc. Natl Acad. Sci. USA 114, 1637–1642 (2017).

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