

# G3-YSD

Y-form DNA; cGAS agonist

Catalog code: tlr1-ydna

<https://www.invivogen.com/g3-ysd>

For research use only

Version 24F10-MM

## PRODUCT INFORMATION

### Contents

- 200 µg G3-YSD (G3-ended Y-form Short DNA)
- 1.5 ml sterile endotoxin-free water

### Sequence

5' GGG TATATATATGCATATATATA GGG 3' (26 mer)

*Note:* G3-YSD contains a palindromic sequence for which self-hybridization results in double-stranded DNA. The flanking guanosine trimers in 5' and 3' remain unpaired.

### Molecular weight

8088.1 g/mol

### Storage and stability

- G3-YSD is shipped at room temperature. Upon receipt, store at -20°C.
- Upon resuspension, prepare aliquots and store at -20°C. Resuspended product is stable for 12 months at -20°C. Avoid repeated freeze-thaw cycles.

### Quality control

- The biological activity has been verified using cellular assays.
- The absence of bacterial contamination, such as lipoproteins and endotoxins, has been confirmed using HEK-Blue™ TLR2 and HEK-Blue™ TLR4 cells.

## DESCRIPTION

G3-YSD is a 26-mer DNA sequence derived from the HIV-1 RNA genome<sup>1</sup>. This palindromic sequence hybridizes with itself and is flanked by unpaired guanosine trimers (G3), which confers its Y-form shape. The guanosine overhangs in this Y-form DNA have been identified as minimal recognition motifs for cGAS (cyclic GMP-AMP synthase, cGAMP synthase), a critical cytosolic DNA sensor<sup>1</sup>. cGAS detects double-stranded DNA (dsDNA) over 40 bp in length (ISD recognition), or stem-loop structures of single-stranded DNA (ssDNA) flanked by unpaired nucleotides (YSD recognition)<sup>1-3</sup>. Interaction of cytosolic DNA with cGAS promotes the synthesis of 2'3'-cGAMP, a second messenger that activates STING (stimulator of interferon genes), and the downstream production of type I interferons (IFNs) and other cytokines<sup>2</sup>. Importantly, type I IFN production upon intracellular delivery of G3-YSD in cGAS-KO cells is abolished, which demonstrates that response to G3-YSD is strictly cGAS-dependent.

1. Herzner AM. *et al.*, 2015. Sequence-specific activation of the DNA sensor cGAS by Y-form DNA structures as found in primary HIV-1 cDNA. *Nat Immunol.* 16(10):1025-33.  
2. Li T. & Chen ZJ., 2018. The cGAS-cGAMP-STING pathway connects DNA damage to inflammation, senescence, and cancer. *J Exp Med.* 215(5):1287-99.  
3. Luecke S. *et al.*, 2017. cGAS is activated by DNA in a length-dependent manner. *EMBO Rep.* 18(10):1707-15.

## TECHNICAL SUPPORT

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## METHODS

### Preparation of G3-YSD stock solution (1 mg/ml)

- Add 200 µl of sterile endotoxin-free water (provided) to 200 µg of G3-YSD.
- Mix gently until completely dissolved.

Working concentration: 100 ng-1 µg/ml

### cGAS stimulation using G3-YSD and LyoVec™ transfection reagent in THP1-Dual™ reporter cells

THP1-Dual™ reporter cells allow the simultaneous study of the NF-κB pathway, by monitoring the activity of SEAP, and the IRF (interferon regulatory factor) pathway, by assessing the activity of secreted Lucia luciferase. These cells derive from the human THP-1 monocytic cell line which is often used to study DNA sensing pathways. Indeed, THP-1 cells express all the cytosolic DNA sensors identified so far (with the exception of DAI).

To achieve cGAS stimulation, G3-YSD must be delivered to the cytoplasm, for example by using a transfection agent, such as LyoVec™. *Note:* The use of G3-YSD Control (negative control) is highly recommended.

1. Rehydrate LyoVec™ and G3-YSD at the recommended concentrations. Bring reagents to room temperature and mix gently to homogenize before use.
2. In a sterile 1.5 ml microfuge tube at room temperature, mix 1 µl (1 µg) of G3-YSD stock solution (1 mg/ml) with 100 µl of LyoVec™. Mix gently.
3. Incubate at room temperature for 15-30 minutes to allow the formation of the complex.
4. Add 20 µl of G3-YSD/LyoVec™ complex (100 ng-1 µg/ml final concentration) to each well of a 96-well plate.
5. To each well containing G3-YSD/LyoVec™ or G3-YSD Control/LyoVec™ complex, add 180 µl of a THP1-Dual™ cell suspension (100,000 cells per well).
6. Incubate for 24-48 hours at 37°C.
7. Determine cGAS stimulation by assessing Lucia luciferase reporter gene expression using QUANTI-Luc™ 4 Lucia/Gaussia.

## RELATED PRODUCTS

Product	Catalog Code
G3-YSD Control	tlrl-ydnac
2'3'-cGAMP	tlrl-nacga23
THP1-Dual™ Cells	thpd-nfis
THP1-Dual™ KO-cGAS Cells	thpd-kocgas
LyoVec™	lyec-1
QUANTI-Luc™ 4 Lucia/Gaussia	rep-qlc4lg1