CL419

TLR2 ligand & nucleic acid carrier

Catalog # tlrl-c419

For research use only

Version # 15B04-MM

PRODUCT INFORMATION

Content:

• 500 µg CL419 provided as a lyophilized powder
• 1.5 ml endotoxin-free water

Storage:

- CL419 is shipped at room temperature. Store lyophilized product at -20 °C. Lyophilized product is stable for 1 year at -20 °C.
- Upon resuspension, store at 4 °C. Resuspended product is stable for 6 months at 4 °C. Do not store resuspended product in plastic tubes.

DESCRIPTION

CL419 is a polyamine TLR2 agonist derived from Pam2CSK4 by replacement of Ser-(Lys)4 by a cationic sperminyl group. CL419 forms positively charged liposomes which allows it to complex nucleic acids and transport them into the cytosol and the nucleus. CL419 / nucleic acid complexes are recognized by TLR2 and nucleic acid sensors leading to the significant activation of the NF-kB and IRF pathways. *In vivo*, CL419 complexed with a plasmid DNA (pDNA) and injected intratumorally induces a modest reduction of the tumor growth (data in InvivoGen Insight Spring 2013).

BACKGROUND

InvivoGen has developed a series of novel molecules designed to induce potent immune responses through the combined activation of several pattern recognition receptors (PRRs) that trigger different innate immune signaling pathways. These molecules are agonists for TLR2, TLR7 or both. Agonists that activate TLR2 are derived from the well-established TLR2 ligand, Pam2CSK4, and those recognized by TLR7 are derived from the 8-hydroxyadenine derivative CL264, a TLR7 agonist recently developed by InvivoGen (see Related Products overleaf).

TLR2 and TLR7 are two PRRs with distinct characteristics. TLR2 is a cell surface receptor expressed by many cell types, while TLR7 is an endosomal receptor expressed predominantly in plasmacytoid dendritic cells (pDC) and to a lesser extent in B cells. TLR2 signaling triggers the NF-κB pathway and the production of pro-inflammatory cytokines, such as TNF-α, whereas TLR7 signaling induces mainly the IRF pathway and the production of IFN-α. Combined activation of these different pathways results in robust immune responses with potential therapeutic effects. InvivoGen's multi-PRR agonists are promising candidates for antitumor and vaccine applications.

CHEMICAL PROPERTIES

Synonym: S-(2,3-bis(palmitoyloxy)-(2RS)propyl)-(R)-cysteinyl spermine

Formula: $C_{48}H_{97}N_5O_5S$

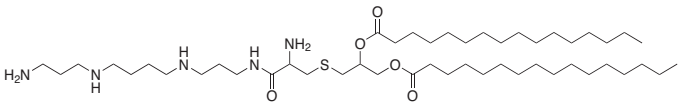
Molecular weight: 856 g/mol

Solubility: H_2O (1 mg/ml)

Working concentration: 1 ng - 100 µg/ml (~1 nM - 100 µM)

Endotoxin level: <0.001 EU/µg

Structure:



APPLICATIONS

CL419 can be used to stimulate TLR2 or as a nucleic acid carrier (described overleaf).

METHODS

CL419 as a TLR2 ligand

Preparation of CL419 stock solution (1 mg/ml)

- Add 500 µl endotoxin-free water to 500 µg CL419. Vortex until complete solubilization.

TLR stimulation with CL419 using HEK-Blue cells

CL419 can be used to stimulate TLR2 in HEK-Blue™ TLR2 cells. These cells stably express an NF-κB-inducible secreted embryonic alkaline phosphatase (SEAP) and overexpress the TLR2 gene. For more information visit: www.invivogen.com/hek-blue-tlr2

1. Stimulate HEK-Blue™ TLR2 cells with 1 ng - 100 µg/ml CL419.
2. Incubate for 6 - 24 h at 37 °C, 5% CO_2.
3. Determine TLR stimulation using a SEAP detection medium, such as QUANTI-Blue™ or HEK-Blue™ Detection (see Related Products, overleaf) or by assessing cytokine expression using an ELISA.

TECHNICAL SUPPORT
InvivoGen USA (Toll-Free): 888-457-5873
InvivoGen USA (International): +1 (858) 457-5873
InvivoGen Europe: +33 (0) 5-62-71-69-39
InvivoGen Hong Kong : +852 3-622-34-80
E-mail: info@invivogen.com

CL419 as a nucleic acid carrier

CL419 has the ability to form complexes with nucleic acids (for example, double-stranded DNA, such as short oligonucleotides or plasmid DNA, or single-stranded RNA) and facilitate their penetration into the cell resulting in their recognition by additional PRRs that sense nucleic acids (e.g. the cytosolic DNA sensors DDX41 and IFI16 and the dsRNA receptors TLR3 and RIG-I/MDA-5) leading mainly to the induction of type I interferons (IFNs). The ability of CL419 to complex nucleic acids is conferred by the presence of a cationic lipid.

Preparation of Nucleic Acid / CL419 complexes

1. Resuspend CL419 at a concentration of 1 mg/ml, as described overleaf.
2. Dilute 6 µl of CL419 with 94 µl serum-free culture medium. Vortex gently 1-2 seconds to mix and incubate for 5-10 min at room temperature.
3. In a sterile 1.5 ml microfuge tube, add 100 µl of the diluted CL419 to 1µg nucleic acid, such as plasmid DNA, a RIG-I ligand or a cytosolic DNA sensor (CDS) ligand. Tap gently to mix.
4. Incubate at room temperature for 10-20 minutes to allow the formation of the complex. Do not store complex for more than 1 day.

Induction of type I IFNs with Nucleic Acid / CL419

Induction of type I IFNs with intracelluar nucleic acids can be studied in a variety of cells. In order to facilitate the study of type I IFN production and the induction interferon stimulated genes (ISG) through interferon regulatory factors (IRFs), InvivoGen has developed stable reporter cells in two well established immune cell models, the human monocytic THP-1 cell line and the murine RAW 264.7 macrophages.

Induction of type I IFNs in THP1-Blue ISG cells

THP1-Blue™ ISG cells were derived from the human THP-1 monocyte cell line by stable integration of an IRF-inducible SEAP reporter construct. THP1-Blue™ ISG cells are highly responsive to PRR agonists that trigger the IFN signaling pathway, such as transfected double-stranded nucleic acid. A protocol for the induction of type I IFNs using THP1-Blue™ ISG cells is given below:

1. Prepare nucleic acid / CL419 complex, as described above.
2. Treat cells with nucleic acid / CL419 complex, for example 6 µg CL419 complexed with 1µg of HSV-60 (see Related Products), for 18 - 24 hours.
3. Monitor induction of type I IFNs by measuring the levels of IRF-induced SEAP in the cell culture supernatant using QUANTI-Blue™, a SEAP detection reagent.

RELATED PRODUCTS

Product	Catalog Code
Reporter Cells	
HEK-Blue™ hTLR2 Cells	hkb-htlr7
HEK-Blue™ mTLR2 Cells	hkb-mtlr7
RAW-Blue™ Cells (Mouse macrophage reporter cells)	raw-sp
Raw-Blue™ ISG Cells (IRF reporter macrophages)	raw-isg
THP1-Blue™ ISG Cells (Human IRF reporter monocytes)	thp-isg
THP1-Blue™ ISG-KD STING Cells (STING knockdown)	thp-kdstg
SEAP Detection Media	
HEK-Blue™ Detection (SEAP detection medium)	hb-det2
QUANTI-Blue™ (SEAP detection medium)	rep-qb1
Dual TLR2 & TLR7 ligands:	
Adilipoline™ (CL413; TLR2 & TLR7 ligand)	tlrl-c413
CL531 (TLR2 & TLR7 ligand)	tlrl-c531
CL572 (TLR2 (human) & TLR7 ligand)	tlrl-c572
TLR ligands & nucleic acid carriers:	
AdiFectin™ (CL347; TLR7 ligand & nucleic acid carrier)	tlrl-c347
CL419 (TLR2 ligand & nucleic acid carrier)	tlrl-c419
PamadiFectin™ (TLR7 & TLR2 ligand, nucleic acid carrier)	tlrl-c553
TLR2 ligands:	
HKLM (Heat killed *Listeria monocytogenes*)	tlrl-hklm
FSL-1 (Synthetic diacylated lipoprotein)	tlrl-fsl
Pam2CSK4 (Synthetic diacylated lipoprotein)	tlrl-pm2s
CDS & RIG-I ligands	
HSV-60 Naked (CDS ligand)	tlrl-hsv60n
ISD Naked (CDS ligand)	tlrl-isdn
pCpGfree-giant Naked (CDS ligand)	tlrl-cpgfn
poly(dA:dT) Naked (RIG-I ligand - CDS ligand)	tlrl-patn
poly(dG:dC) Naked (RIG-I ligand - CDS ligand)	tlrl-pgcn
VACV-70 Naked (CDS ligand)	tlrl-vav70n
5′ppp-dsRNA (RIG-I ligand)	ttlrl-3prna