MPLA-SM VacciGrade™

Monophosphoryl Lipid A from S. minnesota R595; TLR4-based adjuvant

Catalog code: vac-mpla

https://www.invivogen.com/mpla-vaccigrade

For research use only. Not for use in humans.

Version 19A23-MM

PRODUCT INFORMATION

Contents:

- 1 mg MPLA-SM VacciGrade™
- 10 ml sterile endotoxin-free physiological water (NaCl 0.9%)

Storage and stability

- MPLA-SM VacciGrade™ is provided as a clear, lipidic film and shipped at room temperature. Store at -20°C. Product is stable for 1 year when properly stored.
- Upon resuspension, prepare aliquots of MPLA-SM VacciGrade™ and store at -20°C. Resuspended product is stable for 6 months when properly stored. Avoid repeated freeze-thaw cycles.

Quality control

MPLA-SM VacciGrade™ is a preclinical grade preparation of monophosphoryl lipid A (MPLA) derived from *Salmonella enterica* serovar Minnesota R595 LPS. It is prepared under strict aseptic conditions. MPLAs VacciGrade™ is guaranteed sterile.

DESCRIPTION

Monophosphoryl Lipid A (MPLA) is extracted from lipopolysaccharide (LPS or endotoxin) produced by the Re mutant of a rough strain *Salmonella minnesota* R595. Lipid A, a disaccharide with fatty acid side chains, is the component responsible for the endotoxic activity of LPS[1-2]. Removal of one phosphate group from lipid A produces MPLA which has reduced toxicity while retaining the ability to stimulate the immune system[3-4].

Both LPS and MPLA are TLR4 agonists, but they signal through different adaptors, MyD88 and TRIF, respectively. The reduced toxicity of MPLA is attributed to the preferential recruitment of TRIF upon TLR4 activation, resulting in decreased induction of inflammatory cytokines[5]. MPLA has been tested as an adjuvant in mice and reported to induce a strong Th1 response[6-7]. Although the mechanism of action of MPLA has not been fully eludicated, it has been suggested that MPLA improves vaccine immunogenicity by enhancing antigen presenting cell maturation[8].

MPLA-SM is a potent activator of TLR4 with negligible TLR2 activity. MPLA-SM was extracted from LPS using treatment with acid and heat followed by chromatography. Preparations of natural MPLA, such as MPLA-SM, contain a mixture of 5, 6, and 7 acyl lipid A[6].

Note: *Due to the intrinsic structural complexity of lipid A, some batch-to-batch variation may occur.*

1. Martin M. *et al.*, 2003. Role of innate immune factors in the adjuvant activity of monophosphoryl lipid A. Infect Immun. 71(5):2498-507. **2. Ogawa T. *et al.*, 2002.** Cell activation by *Porphyromonas gingivalis* lipid A molecule through Toll-like receptor 4- and myeloid differentiation factor 88-dependent signaling pathway. Int Immunol. 14(11):1325-32. **3. Qureshi N. *et al.*, 1982.** Purification and structural determination of nontoxic lipid A obtained from the lipopolysaccharide of *Salmonella typhimurium*. J. Biol. Chem., 257(19), 11808-15. **4. Romero CD. *et al.*, 2011.** The Toll-Like Receptor 4 agonist monophosphoryl Lipid A augments innate host resistance to systemic bacterial infection. Infect Immun. 79(9): 3576–3587. **5. Mata-Haro V. *et al.*, 2007.** The vaccine adjuvant monophosphoryl lipid A as a TRIF-biased agonist of TLR4. Science. 316(5831):1628-32. **6. Fransen F. *et al.*, 2007.** Agonists of Toll-like receptors 3, 4, 7, and 9 are candidates for use as adjuvants in an outer membrane vaccine against Neisseria meningitidis serogroup. Infect Immun. 75(12) :5939-46. **7. Rhee EG. *et al.*, 2010.** TLR4 Ligands Augment Antigen-Specific CD8+ T Lymphocyte Responses Elicited by a Viral Vaccine Vector. J. Virol. 84: 10413 - 10419. **8. Didierlaurent A. *et al.*, 2009.** AS04, an aluminum salt- and TLR4 agonist-based adjuvant system, induces a transient localized innate immune response leading to enhanced adaptive immunity. J Immunol 183(10): 6186-97.

METHODS

Preparation of sterile stock solution (1 mg/ml)

- Add 1 ml of DMSO to 1 mg of MPLA-SM VacciGrade™ and vortex until complete solubilization, then sonicate.
- Prepare aliquots of stock solution and store at -20°C. Further dilutions can be prepared with endotoxin-free physiological water (provided).

Notes:

- The suspension may appear to contain floating fine particles. Difficulties may be encountered for solubilization at higher concentrations.

- Alternatively, MPLA-SM VacciGrade™ can be resuspended in DMSO containing 0.2 % triethylamine.

Working Concentration: 2 - 20 µg/mouse

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 3622-3480
E-mail: info@invivogen.com

RELATED PRODUCTS

Product	Description	Catalog Code
Adjuvants		
AddaVax™	Squalene-Oil-in-water	vac-adx-10
Alhydrogel 2%	Aluminium hydroxide gel	vac-alu-250
c-di-GMP VacciGrade™	STING agonist	vac-nacdg
Flagellin FliC VacciGrade™	TLR5 agonist	vac-fla
Gardiquimod VacciGrade™	TLR7 agonist	vac-gdq
IFA	Incomplete Freund's adjuvant	vac-ifa-10
Imiquimod VacciGrade™	TLR7 agonist	vac-imq
MPLAs VacciGrade™ (Synthetic MPLA)	TLR4 agonist	vac-mpls
N-glycolyl-MDP VacciGrade™	NOD2 agonist	vac-gmdp
ODN 1585 VacciGrade™	murine TLR9 agonist	vac-1585-1
ODN 1826 VacciGrade™	murine TLR9 agonist	vac-1826-1
ODN 2395 VacciGrade™	human/murine TLR9 agonist	vac-2395-1
ODN 2006 VacciGrade™	human TLR9 agonist	vac-2006-1
Pam3CSK4 VacciGrade™	TLR2 agonist	vac-pms
Poly(I:C) VacciGrade™	TLR3 agonist	vac-pic
R848 VacciGrade™	TLR7/8 agonist	vac-r848
TDB VacciGrade™	Mincle agonist	vac-tdb
OVA Antigens		
EndoFit™ Ovalbumin	For *in vivo* use; endotoxin level <1EU/mg	vac-pova
Ovalbumin	For detection; Western, ELISA	vac-stova
Ova 257-264	For detection; ELISPOT	vac-sin
Ova 323-339	For detection; ELISPOT	vac-isq