

# ODN 2395 VacciGrade™

CpG ODN, type C (human / mouse); TLR9-based adjuvant  
Catalog code: vac-2395-1

<https://www.invivogen.com/odn2395-vaccigrade>

For research use only. Not for use in humans.

Version 20A30-MM

## PRODUCT INFORMATION

### Contents

- 1 mg (141.85 nmol) lyophilized ODN 2395 VacciGrade™
- 10 ml sterile endotoxin-free physiological water (NaCl 0.9%)

### ODN 2395 sequence:

5'-tcgtcgttttcggcgcgcgccc-3' (22 mer)

*Note: Bases are phosphorothioate, palindrome is underlined.*

### Storage and stability:

- ODN 2395 VacciGrade™ is shipped at room temperature and should be stored at -20°C. Lyophilized product is stable for 1 year when properly stored.

- Upon resuspension, prepare aliquots of ODN 2395 VacciGrade™ and store at -20°C. Resuspended product is stable for 6 months when properly stored. Avoid repeated freeze-thaw cycles.

### Quality control:

ODN 2395 VacciGrade™ is a preclinical grade preparation of the CpG ODN 2395. It is prepared under strict aseptic conditions and is tested for the presence of endotoxins. ODN 2395 VacciGrade™ is guaranteed sterile and its endotoxin level is <1 EU/mg.

## METHODS

**Working Concentrations:** 20-50 µg/mouse

### Preparation of sterile stock solution (2 mg/ml)

- Add 500 µl endotoxin-free physiological water to 1 mg ODN 2395 VacciGrade™ to obtain a solution at 2 mg/ml.
- Mix the solution by pipetting up and down.

## DESCRIPTION

Synthetic oligodeoxynucleotides containing unmethylated CpG motifs (CpG ODNs) have been extensively studied as adjuvants<sup>1</sup>. These CpG motifs are present at a 20-fold greater frequency in bacterial DNA compared to mammalian DNA<sup>2</sup>. CpG ODNs are recognized by TLR9, which is expressed exclusively on human B cells and plasmacytoid dendritic cells (pDCs), thereby inducing Th1-dominated immune responses<sup>3</sup>. Pre-clinical studies, conducted in rodents and non-human primates, and human clinical trials have demonstrated that CpG ODNs can significantly improve vaccine-specific antibody responses<sup>1</sup>.

Three types of stimulatory CpG ODNs have been identified, types A, B and C, which differ in their immune-stimulatory activities<sup>4,5</sup>. Furthermore, CpG ODNs activate TLR9 in a species-specific manner<sup>6</sup>. ODN 2395 is a type C CpG ODN specific for mouse TLR9<sup>7</sup>. Type C CpG ODNs contain a full phosphorothioate backbone with one or more CpG dinucleotides. Type C CpG ODNs are potent inducers of IFN-α from pDC and strong B cell activators<sup>8,9</sup>. *In vivo* studies have demonstrated that type C ODNs which combine the effects of types A and B ODNs, such as ODN 2395, are very potent Th1 adjuvants<sup>10</sup>.

1. Steinhagen F. *et al.*, 2011. TLR-based immune adjuvants. *Vaccine* 29(17):3341-55.  
2. Hemmi H. *et al.*, 2000. A Toll-like receptor recognizes bacterial DNA. *Nature* 408:740-5.  
3. Coffman RL. *et al.*, 2010. Vaccine adjuvants: Putting innate immunity to work. *Immunity* 33(4):492-503.  
4. Krug A. *et al.*, 2001. Identification of CpG oligonucleotide sequences with high induction of IFN-α/β in plasmacytoid dendritic cells. *Eur J Immunol*, 31(7): 2154-63.  
5. Marshall JD. *et al.*, 2005. Superior activity of the type C class of ISS in vitro and in vivo across multiple species. *DNA Cell Biol.* 24(2):63-72.  
6. Bauer S. *et al.*, 2001. Human TLR9 confers responsiveness to bacterial DNA via species-specific CpG motif recognition. *PNAS*, 98(16):9237-42.  
7. Moseman EA. *et al.*, 2004. Human plasmacytoid dendritic cells activated by CpG oligodeoxynucleotides induce the generation of CD4+CD25+ regulatory T cells. *J Immunol.* 173:4433-4442.  
8. Jurk M. *et al.*, 2004. C-Class CpG ODN: sequence requirements and characterization of immunostimulatory activities on mRNA level. *Immunobiology.* 209(1-2):141-54.  
9. Abel K. *et al.*, 2005. Deoxycytidyl-deoxyguanosine oligonucleotide classes A, B, and C induce distinct cytokine gene expression patterns in rhesus monkey peripheral blood mononuclear cells and distinct alpha interferon responses in TLR9-expressing rhesus monkey plasmacytoid dendritic cells. *Clin Diagn Lab Immunol.* 12(5):606-21.  
10. Vollmer J. *et al.*, 2004. Characterization of three CpG oligodeoxynucleotide classes with distinct immunostimulatory activities. *Eur J Immunol.* 34(1):251-62.

## RELATED PRODUCTS

Product	Description	Catalog Code
2'3'-cGAMP VacciGrade™	STING agonist	vac-nacga23
Alhydrogel® adjuvant 2% CFA	Al(OH) <sub>3</sub> gel	vac-alu-250
ODN 1826 VacciGrade™	Complete Freund's Adjuvant	vac-cfa-10
ODN 2006 VacciGrade™	Murine TLR9 agonist	vac-1826-1
Poly(I:C) VacciGrade™	Human TLR9 agonist	vac-2006-1
	TLR3 agonist	vac-pic

For a complete list of adjuvants provided by InvivoGen, please visit <https://www.invivogen.com/vaccine-adjuvants>.

## 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 3622-34-80  
E-mail: [info@invivogen.com](mailto:info@invivogen.com)

