

Content and product information

CNE-CPO vaccine adjuvant is a squalene oil-in-water emulsion containing cationic components.

Description

CNE-CPO is an oil-in-water Cationic Nano Emulsion made of squalene droplets and cationic polymers in a continuous aqueous phase. It is biodegradable, which is an important advantage over alternative oils that have been used in emulsion adjuvants, like Freund's adjuvant that contains mineral oil (paraffin oil) and has long term persistence in the organism. CNE induces local stimulation and recruitment of DCs and granulocytes, differentiation of monocytes into DCs and increased uptake of antigen by DCs. The emulsion acts more specifically on macrophages present at the site of injection. A local increase of chemokines released also influences the recruitment of immune cells from the blood to the site of vaccination, creating an amplification loop. This formulation enhances differentiation of monocytes towards a mature phenotype, thereby promoting migration of antigen-loaded cells to the draining lymph node. Compared to aluminum salts, a stronger immune response is elicited (e.g. higher antibody "humoral response, Th2" and T-cell response "cellular response Th1") with a mixed and more balanced Th1/Th2 cell phenotype.

The cationic components that compose this nano-emulsion make it a genetic adjuvant that allows the association with plasmid DNA to form an efficient nanoparticle delivery system (NPD). NPD are **non-viral gene delivery systems**, self-assembled from cationic entities and negatively charged immunogen that function as **vaccine carrier**.

CNE-CPO adjuvant is compatible with most immunization procedures: such as intramuscular, intraepidermal, intravenous, intraperitoneal or subcutaneous.

Plasmid DNA

Cationic formulation-mediated antigen-coding plasmid DNA has been shown to greatly improve humoral and cell-mediated immunity. One of the possibilities is that these DNA vaccines could facilitate uptake of the plasmid by antigen-presenting cells (APC) and induce cytotoxic T lymphocyte response. Moreover, once entrapped into nanoparticles, DNA is protected from nucleases and depending on their size, some NPD may break down locally to release their vaccine content slowly; the accessibility of genetic material is thus prolonged.

Kit contents

CNE1000: 1 mL of CNE-CPO.
CNE5000: 5 mL of CNE-CPO.

Certificate of analysis on demand.

Method | Protocol

Recommendations before starting:

The inoculum should be free of extraneous microbial contamination; use plasmid DNA as pure as possible. Adapt volumes according to table 1 below.

1. Allow CNE adjuvant and immunogen solutions to reach room temperature before beginning.
2. Shake gently the CNE vial before opening.
3. Dilute immunogen/DNA/RNA in saline buffer or phosphate buffer for a final concentration of 10-100 µg/100 µL.

It is mandatory to use buffer without serum.

4. Mix CNE adjuvant with an equal volume of immunogen/DNA/RNA solution for a 1:1 ratio.
5. Pipette up and down several times to ensure correct mixing.
6. Incubate at room temperature for 20-30 min.
7. Inject into the animal according to the table below.

NOTE: do not store the complexes. Discard solution after use. Prepare a fresh LPD before each immunization.

Typical routes of administration include subcutaneous (SC), intramuscular (IM), intradermal (ID) or intraperitoneal (IP).

Species	IM	SC	ID	IP
Mice, hamsters	0.05-0.1 mL	0.1-0.2 mL	0.025 mL	0.5 mL
Guinea pigs, rats	0.1-0.2 mL	0.2-0.4 mL	0.025 mL	1.0 mL
Rabbits	0.25 mL	0.25 mL	0.025 mL	10 mL
Pigs	0.25-0.5 mL	0.5 mL	0.5 mL	50 mL

Table 1: Recommended volumes (mL) for injection of immunogen/adjuvant mixtures per site of injection for different animal species (adapted from Leenars MPPA, Hendriksen CFM et al., 1999).

Use, handling and storage

For Research Use Only. Not for use in humans. Not for use in diagnostic or therapeutic purposes.

Shipping conditions: Room Temperature.

Storage conditions: 4°C.

Shelf life: 1 year from the date of purchase.

⚠ Do not freeze.

Results

Results presented below demonstrate the effect of CNE adjuvant on immune system response:

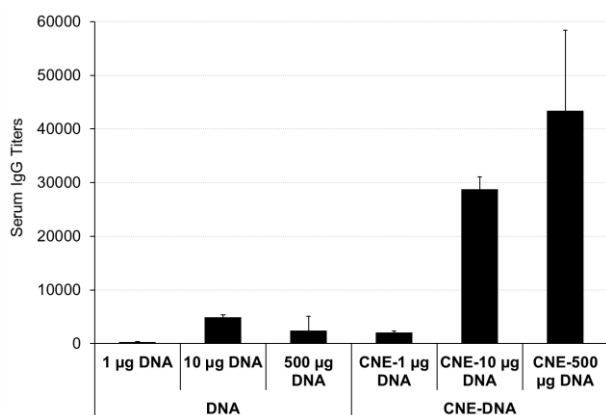


Figure 1. Comparison of immune response in mice and rabbits injected with naked- or CNE-DNA at either 1, 10 or 500 µg. Sera were analyzed by ELISA (adapted from G. Ott *et al.* *J. Control. Release*, 2002; 79(1-3), 1-5).

References and background reading

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- L. A. Brito, M. Chan *et al.* A cationic nanoemulsion for the delivery of next-generation RNA vaccines. *Molecular Therapy*, 2014, vol. 22, no 12, p. 2118-2129.
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- K. Adlington, J. EL Harfi *et al.* Molecular design of squalene/squalane counter-types via the controlled oligomerization of isoprene and evaluation of vaccine adjuvant applications. *Biomacromolecules*, 2016, vol. 17, no 1, p. 165-172.
- E. S. BesumbeS, C. Fornaguera *et al.* PLGA cationic nanoparticles, obtained from nano-emulsion templating, as potential DNA vaccines. *European Polymer Journal*, 2019, vol. 120, p. 109229.
- A. S. A. Medeiros, M. Torres-rêgo *et al.* Self-assembled cationic-covered nanoemulsion as a novel biocompatible immunoadjuvant for antiserum production against *Tityus serrulatus* scorpion venom. *Pharmaceutics*, 2020, vol. 12, no 10, p. 927.

Related Products

Ref	Description
#AH0250	AlumVax Hydroxide 2%
#AP0250	AlumVax Phosphate 2%
#SQ0100	SqualVax, squalene oil-in-water emulsion
#CFA0100	Complete Freund's Adjuvant (CFA)
#CV02000	CaLiVax-DOTAP Adjuvant
#LV02000	LipoVax NTA(Ni)

Purchaser Notification | Conditions of Sale

This product is sold in accordance with our general conditions of sale that you can find on our website: <https://ozbiosciences.com/content/3-terms-and-conditions>.