SqualVax Vegetal
Phytosqualene based adjuvant

Content and product information

SqualVax is a phytosqualene-based oil-in-water emulsion similar to MF59®.

Description

SqualVax is an oil-in-water emulsion made of squalene droplets in a continuous aqueous phase. The new **SqualVax Vegetal** is similar the renown **SqualVax** vaccine adjuvant, except that squalene sourced from animal origins has been advantageously replaced with phytosqualene (plant-derived) extracted from first choice European olive oil.
Originally, the largest squalene natural source was the liver oil of certain fish, especially deep-sea sharks, from which it derives its name. Shark-derived squalene has been supplying global market demands for years since its initial discovery. However, intensive fishing had a devastating impact on marine ecosystems and endangered the populations of squalene producing shark species.
The **SqualVax Vegetal** vaccine adjuvant offers the same outstanding features as its counterpart derived from animal origin, but at a much lesser ecological cost, using only premium quality squalene extracted from olive oil.

SqualVax Vegetal is fully 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 organisms.

Squalene emulsion 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.

Kit contents

SQV0010: 10 mL of SqualVax Vegetal.
SQV0050: 5x10 mL of SqualVax Vegetal.
SQV0100: 10x10 mL of SqualVax Vegetal.

Certificate of analysis on demand.

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.

Method | Protocol

Recommendations before starting:
The inoculum should be free of extraneous microbial contamination; filtration of the antigen before mixing with the adjuvant is recommended. Allow SqualVax to reach room temperature before beginning.

1. Vigorously shake the SqualVax Vegetal vial before opening.

2. Dilute antigen mixture in saline buffer or phosphate buffer for a final immunogen concentration of **10-100 µg/100 µL.**

3. Mix SqualVax adjuvant with an equal volume of antigen solution for a **1:1** ratio.

4. Pipette up and down several times to ensure correct mix.

5. Inject into the animal according to the table below; the volume depends on the site of injection. Typical routes of administration include subcutaneous (SC), intramuscular (IM), intradermal (ID) or intraperitoneal (IP).

NOTE: do not store complexes, discard solution after use. Prepare fresh NPD before each immunization.

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

Species	Max vol. / Site	Primary Injection	Subsequent Injection(s)
Mice, hamsters	0.1 mL	SC	SC
Mice, hamsters	0.05 mL	IM$^{\Delta}$	IM$^{\Delta}$
Mice	0.5 mL	IP$^{\times}$	SC, IM$^{\Delta}$
Guinea pigs, rats	0.2 mL	SC, IM$^{\Delta}$	SC, IM$^{\Delta}$
Rabbits	0.25 mL	SC, IM	SC, IM
Rabbits	0.025 mL	ID	SC, IM
Sheep, goats, donkeys, pigs, chickens	0.5 mL	SC, IM	

Δ Not recommended in general, particularly for viscous adjuvants.
$\times$ Not recommended for pAb production.

Table 1: Maximum volumes for injection of immunogen/adjuvant mixtures per site of injection for different animal species (*Adapted from Leenars MPPA, Hendriksen CFM et al., 19*).

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Animal *vs* Vegetal

Several studies proved in the past that replacing the squalene derived from shark liver with one sourced from plants had no impact on the adjuvating effect using squalene derived oil in water emulsions. For example, the figure 3 displayed insights of such results presenting ELISA titers assessing the amount of antibodies raised against each of the meningococcal B protein antigens in a single serum pool per group. The immunoglobulin G (IgG) titers against each of the antigens were very consistent with a 10 µg and 1 µg antigen dose regardless of the source of Squalene (animal derived in SqualVax, plant-derived for SqualVax Vegetal). Total IgG titers fall at the 0.1 µg dose with SqualVax and the 1 µg dose with 1/10th SqualVax. Importantly there were no differences between the sources of Squalene, regardless of the antigen doses measured.

Results

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

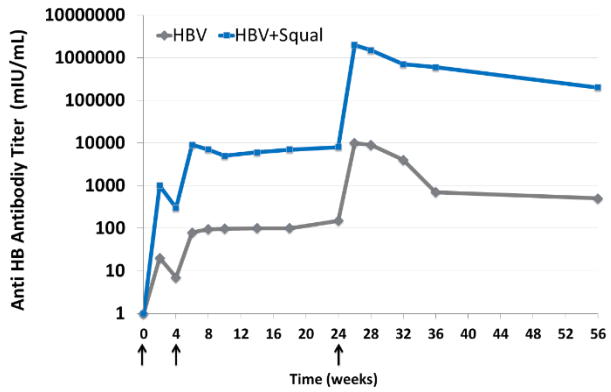

Figure 1. Duration of antibody response in baboons vaccinated against hepatitis B virus (HBV) at weeks 0, 4 and 24 with or without squalene emulsion (*adapted from Traquina P. et al., J Infect Dis. 1996; 174(6):1168-75*).

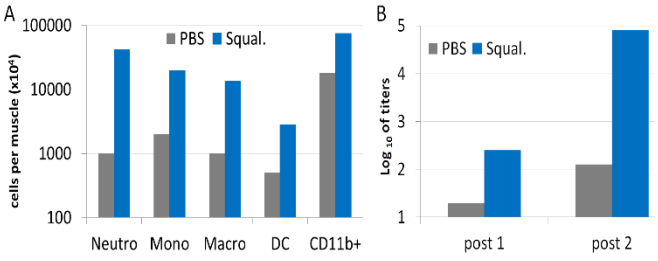

Figure 2. Innate and adaptive immune responses in mice after squalene-adjuvanted immunization. (A) Cell recruitment in muscle 24H after injection (IM) of ovalbumine (OVA; 10 µg per mouse) in presence of PBS or squalene emulsion. (B) OVA-specific antibody titers enhanced by squalene emulsion. Mice were immunized twice with OVA in PBS or squalene emulsion and OVA-specific antibody titers were measured by ELISA after the first and second immunization (*adapted from Vono M. et al., PNAS. 2013; 110(52):21095-100*).

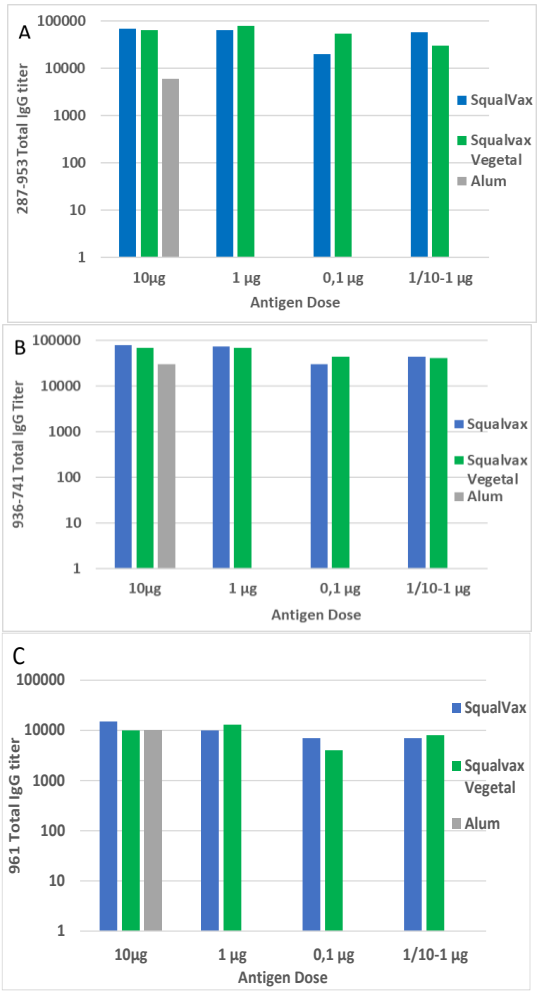

Figure 3. Serogroup B meningococcus ELISA titers against the three antigens used for immunization 287–953 (GNA2132-1030, Graph A), 936–741 (GNA2091-1870, Graph B), and 961 (NadA, Graph C). Sera were pooled into a single pool for each group. Animals were immunized with 10 µg of each antigen, with alum, or SqualVax containing squalene derived from an animal or plant source, 1 µg each antigen with SqualVax or 1/10th the concentration of SqualVax containing squalene derived from an animal or plant source, or 0.1 µg antigen with MF59 containing squalene derived from an animal or plant source (*adapted from Brito et al., Vaccine, 29 (2011) 6262*).

Related Products

Ref	Description
#AH0250	AlumVax Hydroxide 2%
#AP0250	AlumVax Phosphate 2%
#CFA0100	Complete Freund's Adjuvant (CFA)
#CV02000	CaLiVax-DOTAP Adjuvant
#LV02000	LipoVax NTA(Ni)

Purchaser Notification | Conditions of Sale

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